hp-ux/usr

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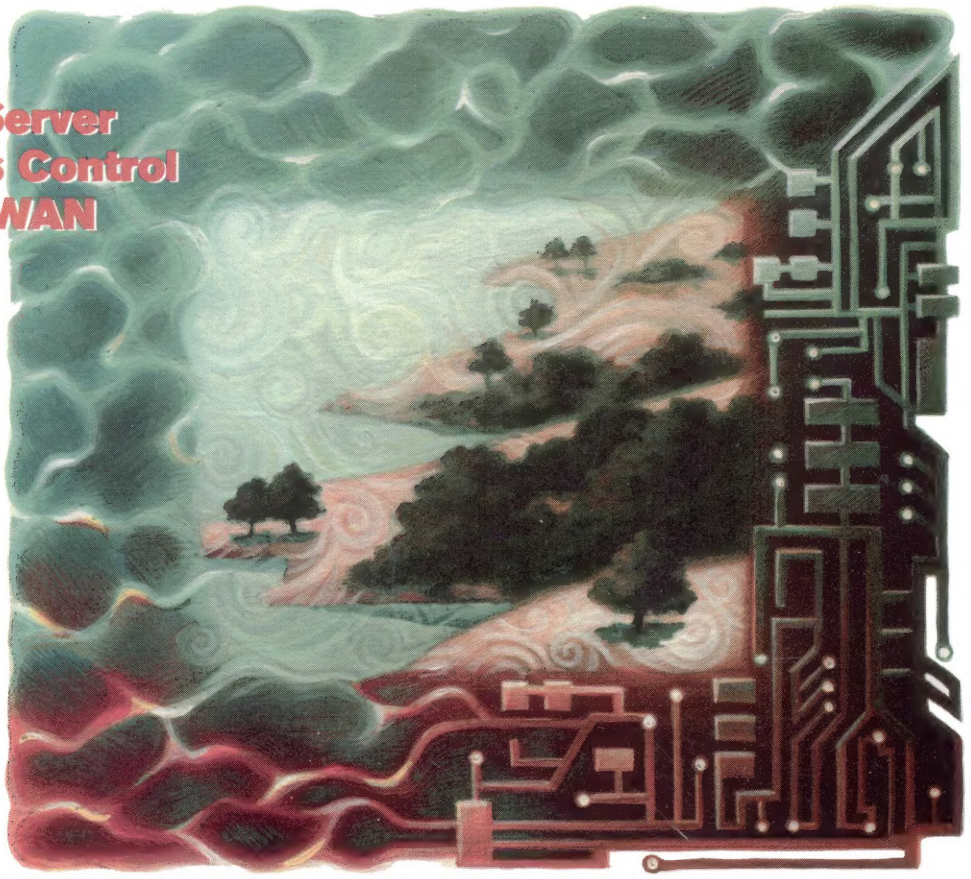
Client-Server Process Control Over a WAN



An Introduction to Threads • Hardware Review: Model 712

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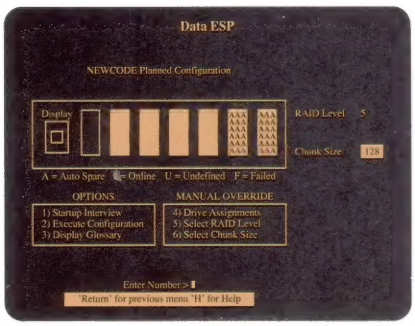

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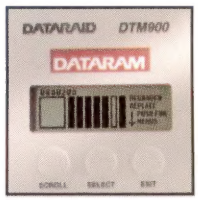
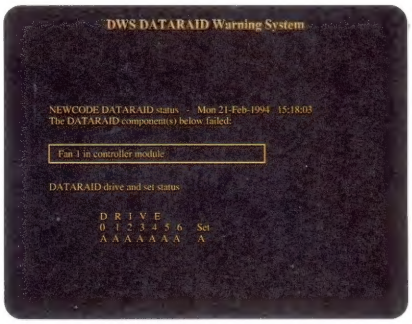
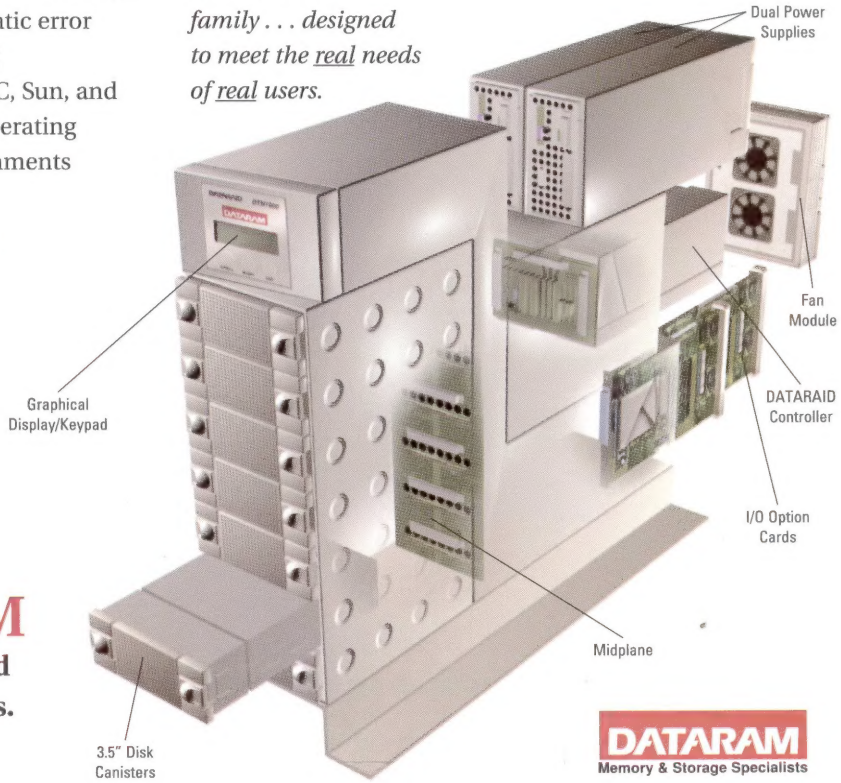


DATARAID's graphical user interface visually displays status of all components.



E-mail status report generated by DWS DATARAID Warning System.



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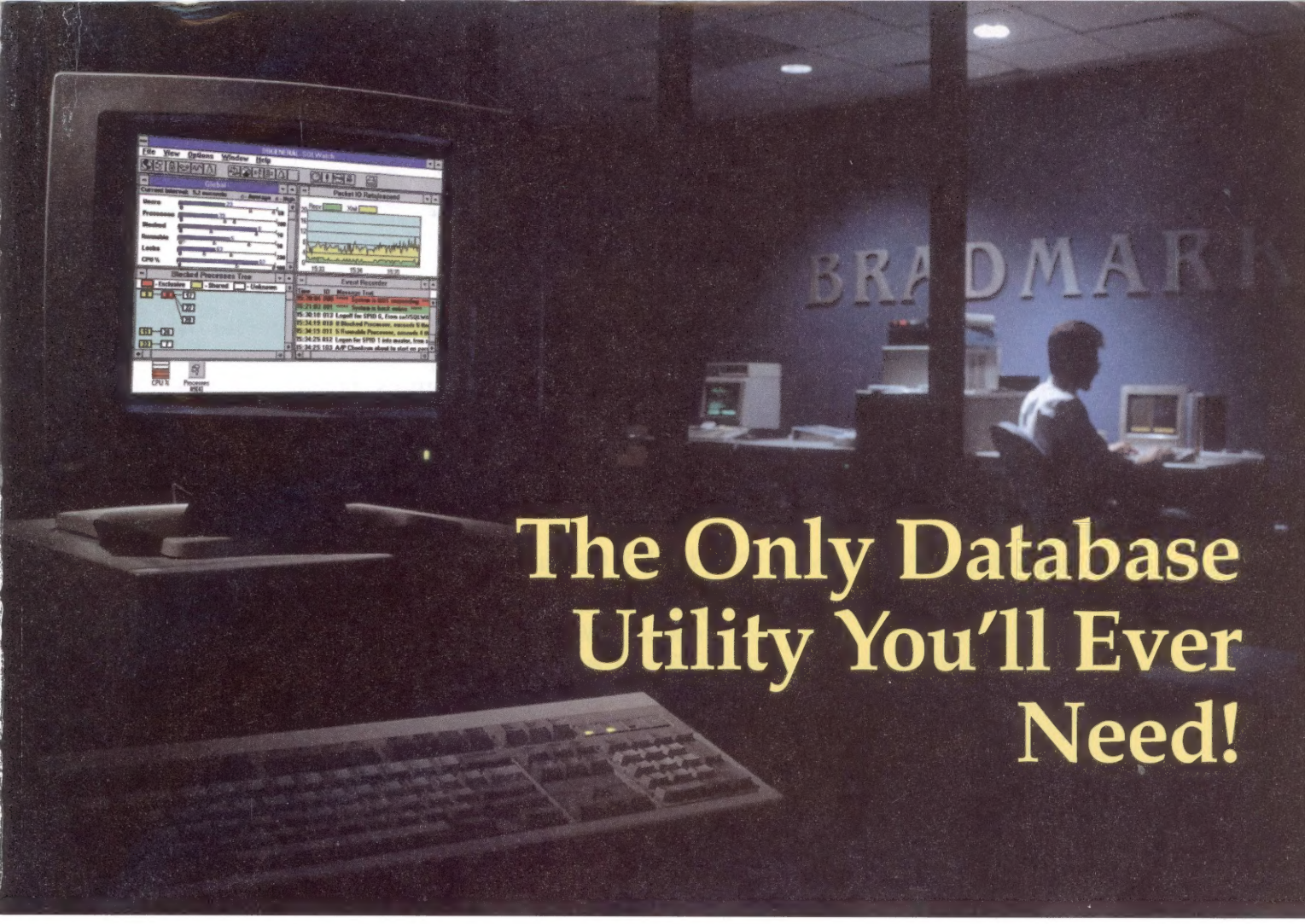

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CIRCLE 41 ON READER SERVICE CARD

New HP-UX Software Library Edition Released by Interex

The 1994 HP-UX Contributed Software Library (CSL) will be available on June 1. The new release contains utilities and applications created by experienced users to target the specific challenges facing HP-UX installations. The release contains 48 programs, some of which come directly from Hewlett-Packard Labs. This year's release is one of the most extensive software library collections available today configured specifically for users of HP-UX.

According to Paul Gerwitz, CSL/HP-UX Committee Chairman:

> ***"We have attempted to anticipate our members' needs through some of the contributions in this year's release, while providing new functionality, especially in integrating to non-HP-UX environments. We are grateful to the many Interex members and other interested organizations whose hard work contributed to this release."***

Many exceptional systems administration programs were also contributed. These include:

- 'top'
- 'psort'
- 'traceroute'
- 'sudo'
- current versions of 'perl' and 'imake'

New utilities include:

- the Free Software Foundation's C compiler 'gcc' and libraries
- a movie viewer to display sequenced graphics

All submissions are evaluated by the CSL/HP-UX Quality Assurance Team for technical quality and accuracy, ensuring that the CSL release contains only the highest caliber programs.

This edition of the library is available in preferred software formats: 1600 or 6250 bpi magnetic tape, Linus cartridge tape (CS-80), Digital Audio Tape 4mm (DAT), and magneto-optical disk, which allows users to store large amounts of software online.

HP-UX users who subscribe to CSL Site-level membership in Interex pay an annual fee of $495 and automatically receive the annual HP-UX CSL release in addition to conference discounts, HP-UX-specific publications, access to Special Interest Groups (SIGs), and the benefits of an extensive advocacy program. An index of the entire HP-UX CSL Library is available from the Member Services Department. Phone 800.INTEREX, fax us at 408.747.0947, or send an e-mail message to csl@interex.org.

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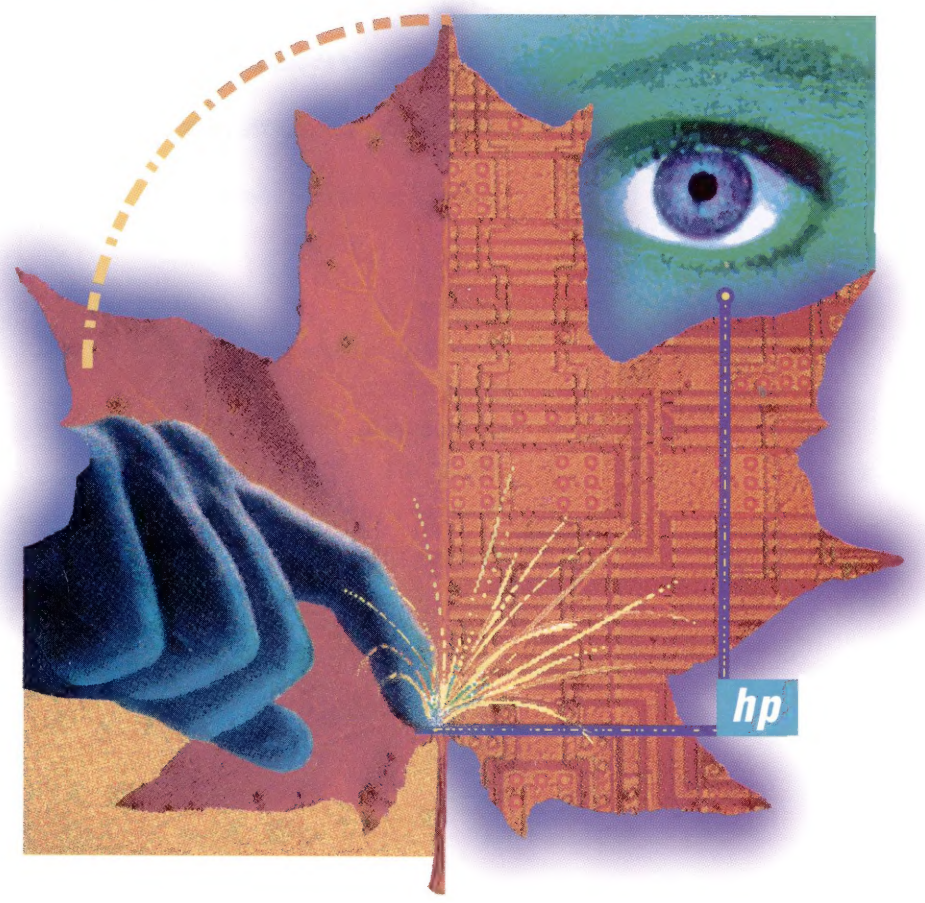

New in 1995!

The Interex Conference & Expo, the premiere conference for HP computing professionals, is getting even better. The Interex '95 Conference & Expo in Toronto will include a two-day Executive Symposium (formerly Executive Interex), focused on strategic management issues for long-term technology planning. The Executive Symposium will provide you with the authoritative and objective information you'll need to successfully manage technology in a complex and competitive global economy.

And what's more...

The program has been planned so that Executive Symposium attendees will also be able to attend the Interex '95 general conference sessions and keynotes, meet with top-level HP management, and have access to the hundreds of exhibits at the Expo, saving you months of product review time.

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Future Conference Dates

Interex '95 Programmer's Forum (IPROF)
April 5 – 8
Cupertino, CA

Interex '96 Conference & Expo
August 4 – 8
San Diego, CA

Interex '97 Conference & Expo
August 24 – 28
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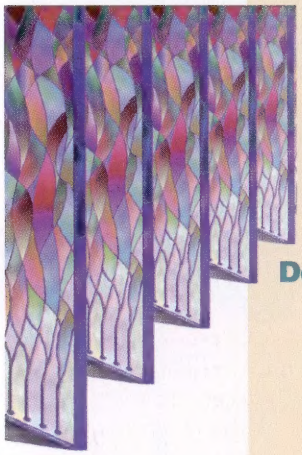
hp·ux/usr

Volume 2, Number 6 November 1994

Contents



see page 24

Features

Client-Server Process Control over a WAN *by Kevin B. Wong* 24

An Introduction to Threads *by Mark DiPasquale* 34

Hardware Review: Model 712 *by Sean Reifschneider* 42

Departments

Letter from the Editor 8

Q & A 10

HP 1000 Guru 20

CSL/HP-UX 56

Product Focus 58

New Products 60

Columns

HP-UX Systems Administration *by Chris Curtin* 44

X-Watch *by Larry Headlund* 48

HP-UX *by David Totsch* 54

New Products
See page 60

Cover Story:
See page 34

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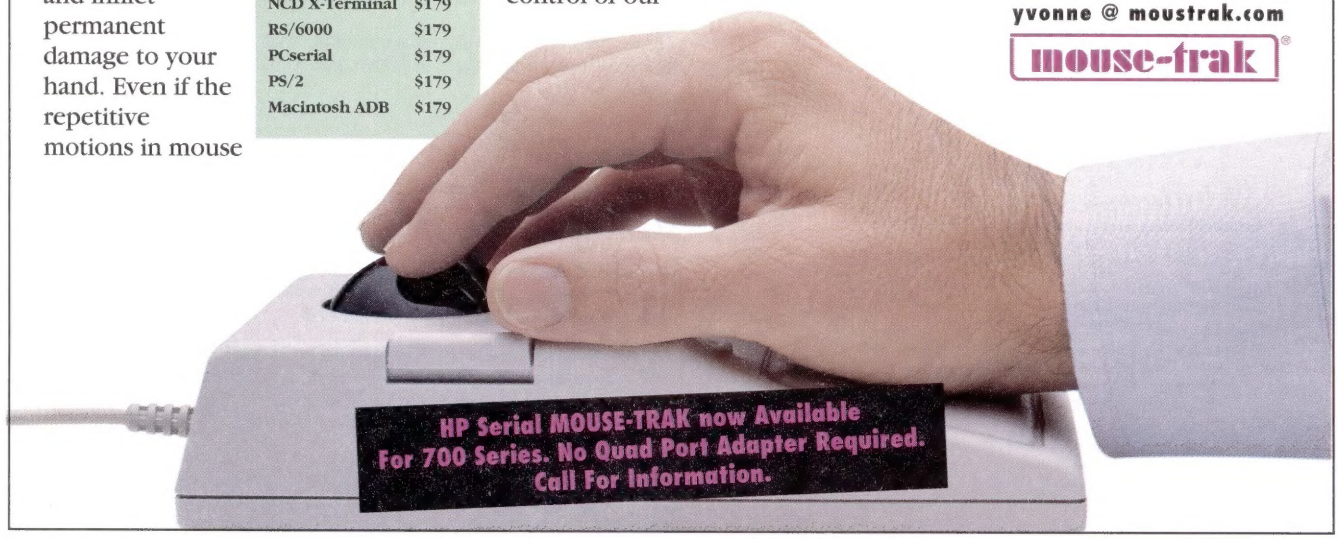

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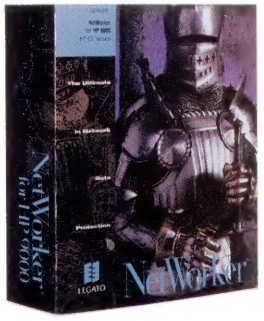

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CIRCLE 136 ON READER SERVICE CARD

Letter From The Editor

IN THE TABLE OF contents of this issue of *hp-ux/usr* you will find a new department: **HP 1000 Guru**. The column itself is by no means new; it has its beginnings in the earliest publications of Interex. Indeed, Bill Hassell, who shares responsibility with Rudy Stanley for the **Question & Answer** department, wrote the HP 1000 Guru column for *TC Interface* magazine. Walt Boeninger has been doing the Guru column for *Real-Time Interface* and he now joins the team of *hp-ux/usr* columnists. Welcome Walt!

Economic concerns finally forced the demise of *Real-Time Interface*. But Interex has always had a loyal HP 1000 constituency, and Interex publications will continue to provide HP 1000 users the information and support they need. Several months ago RTE members were sent a questionnaire about the status of *Real-Time Interface* and a majority of them endorsed the idea of including HP 1000 and RTE material in *hp-ux/usr*.

For many reasons, *hp-ux/usr* is the logical choice as a home for 1000 articles. The magazine treats not only business but technical and scientific computing. Many HP 9000 users also have 1000s—in, for example, process control and laboratory settings—and are wearing two hats at once as system administrators. Systems integration and networking are of major concern to many *hp-ux/usr* readers. RTE and HP-UX audiences should overlap to a not inconsiderable extent.

So, welcome RTE readers! Walt Boeninger's **HP 1000 Guru** will be a regular department in *hp-ux/usr*. We will also run RTE and HP 1000 features and the folks in the RTE lab will continue to supply articles on upgrades and changes. Readers often will find articles on topics relevant to both 9000 and 1000 users. This month's feature "Client-Server Process Control over a WAN" by Kevin Wong is a case in point. It describes a process-control WAN involving HP 1000s and HP 9000s.

Michael Ehrhardt
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CIRCLE 16 ON READER SERVICE CARD

Question & Answer

Q: Is there a way to recycle CD-ROMs?

A: In the past, it has been difficult to locate recyclers that would accept the polycarbonate discs with the paint and aluminum layers. However, the volume of CD-ROMs has vastly increased over the last few years and now some recyclers will accept this material. HP has just begun a program to recycle CD-ROM discs that includes using low-cost recycled packaging for distribution, plus creating a mailback address where discs can be sent for disposal.

Mailing the recycled disc to the recycler will cost about 39 cents in postage. In the U.S., the HP CD-ROM Recycling Center is at 1426 Indianhead Drive, Menomonie, Wisconsin 54751.

Q: How do I print 80 lines per page on a LaserJet printer?

A: With any of the PCL page printers (LaserJet, PaintJet and DeskJet), the options are:

-otl80 -ol88 -olpi8

as in:

```
lp -dmyprinter -otl80 -ol88 -olpi8 some_file_to_print
```

This will print 80 lines per page of simple ASCII text. For other lines per page, refer to your LaserJet/DeskJet/PaintJet technical reference manual, paying particular attention to the items Page Size, Page Length, Top Margin, Text Length, and Vertical Motion Index or Line Spacing. Note that Line Spacing is limited to the following list:

1, 2, 3, 4, 6, 8, 12, 16, 24, 48

Any other values are ignored.

Q: How can I activate job separation in the LaserJet 3Si and 4Si?

A: The LaserJet 3Si and 4Si have job separation or offset so that each print task can be easily separated. For the LaserJet 3Si, this is performed with the escape sequence:

ESC and: &l1T

For clarification, the characters are ESCAPE (octal 033), & ampersand, l lowercase L, 1 one, and T capital T with no intervening spaces. This escape sequence should be sent to the printer *only* when the printer is in PCL mode.

For the model scripts laserjet, laserjetIIIsi, PLC5, and net_lj4x, this can be placed at the very end of the script prior to the ending stty command.

The LaserJet 3Si cannot AUTO sense, so the default setting for the printer should be PCL and the language changed explicitly with `-opostscript`. For example:

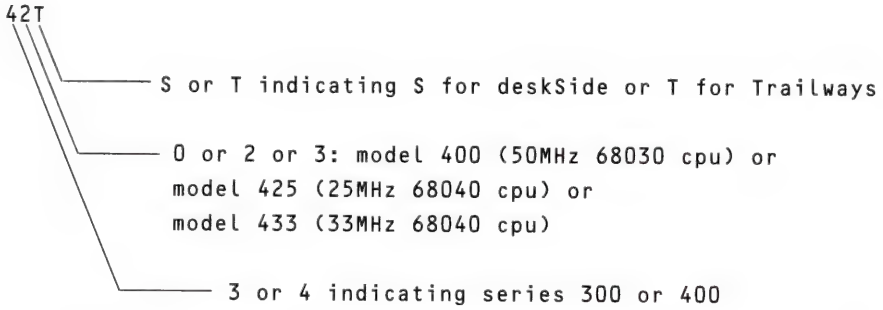
```
#
# move the job separation bar to the opposite side for job
# offset
#
echo "\033&l1T\c"
```

The description of the job separation sequence in the manuals is not very clear. When the above sequence is received, the bar moves in the opposite direction, so this is not a feature-enable, but a direct action; that is, it must be issued at the end of *every* job.

For the LaserJet 4Si (which is different), just set JOB SEPARATION to ON. At the end of every job, the stacker (top output tray) will be moved to the other side automatically. In this case, it is a feature-enable option and nothing needs to be sent to the printer to move the bar after each job.

Q: How do I decode the `uname -i` for 9000/400 series computers?

A: The HP-UX command `uname -i` will return the model number of the CPU. For the Series 400s, decoding the name requires the following chart:



Trailways and deskSide were project names for these systems during the design phase, hence the use of the S and T codes.

Q: I need to copy a complete directory structure to another location. How can I do this (`cp -r` doesn't always work)?

A: The best (and fastest) way is to use `cpio -p` as in:

```
cd /<the_directory_to_be_copied)
find . | cpio -pdmuxvl /new_directory
```

Now you have a copy of the directory at the new location: */new_directory*. This method ensures that symbolic links and other special files are copied correctly. If you are moving the directory structure to a new disk, be sure to delete the files in the old directory to regain the disk space.

Q: I don't want disk quotas on my machine but I still get a message saying that they are being checked. How do I disable this?

A: The easiest way is to remove execute permissions for */usr/bin/quota* as in:

```
chmod -x /usr/bin/quota
```

This prevents `quota` from running. It's also a self-documenting flag in that a future system manager who tries to run */etc/quota* will get the "cannot execute" error message, which suggests the fix.

Q: I am using the new JetDirect card that supports lpd, but how can I suppress the trailing page that has header information?

A: For non-HP-UX systems, you can use the -h option. From the lpr man page:

-h Suppress printing the burst page.

Q: I used the `du` command to see the size of a directory, but cpio reports fewer blocks. What's happening?

A: `du` reports the number of

512-byte blocks of disk space used for each file, no matter how small the file might be. 512 bytes is the smallest unit for reading/writing to the disk and depending on the inode and fragment setting for a given disk section, a 1-byte file might occupy two or four blocks. However, cpio reads the actual file length and reports just that amount. Restoring the file will cause the actual space used to round up to the smallest fragment size in the new filesystem.

Q: I have a new JetDirect card and the new C.02.00 software. I have been using `hpnpstat` but it has been removed. Where are the `hpnpstat` options and how can I read all of them using a command line string?

A: Most of the options were rolled into `hpnpadmin`. *Listing 1* shows a list of the new options, incorporated into a script to format them nicely on standard-out.

Q: How can I test my disk for errors?

A: You can use `dd` to read the entire disk, swap and boot areas included. The format would be:

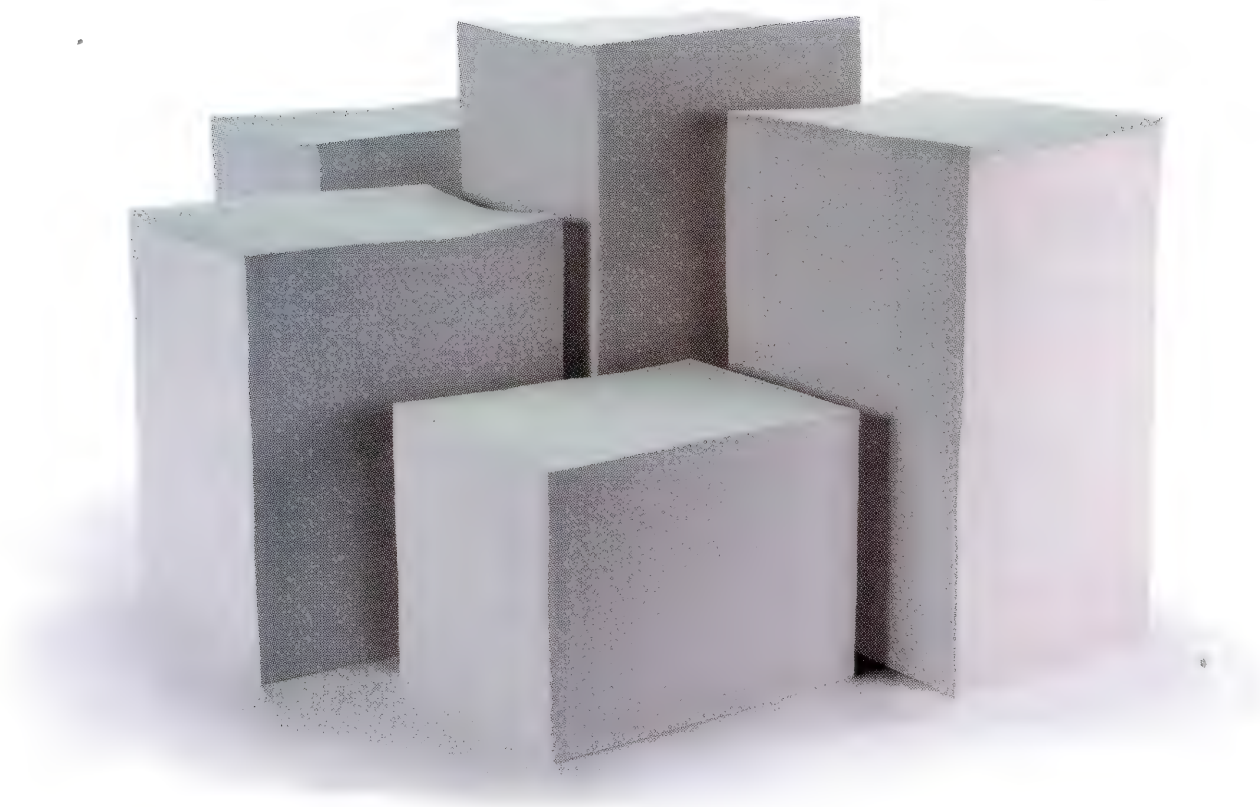
```
dd if=INFILE of=/dev/null bs=64k
```

where INFILE is the raw device file pointing to your disk. For LVM, you need to use the */dev/rdsk/** file ending in s2 (for section 2). To find the right hardware path on the 800s, use */etc/lssf*.

Q: How do I optimize performance

LISTING 1

```
#!/bin/sh JetDirect TCP-IP debug script
#
# Use to report all status info from a JetDirect peripheral
#   For use with C.02.02 JetDirect software
#
#  For hphpadmin:
#   usage: hpnpadmin [-aAbdDfijklnoOpqrsStvw]
#                    [-mM protocol]
#                    [-c community] printer_name
#     <none>  -  same as -s
#     -a      -  check that this host is on the access list
#     -A      -  check that peripheral is a network peripheral
#     -b      -  show the bootup information
#     -c      -  specify the SNMP community name
#     -d      -  dump the SNMP PDUs
#     -D      -  dump the memory image
#     -f      -  show Bootp server name
#     -i      -  show printer ID
#     -j      -  show the peripheral job info
#     -k      -  kill the active TCP connection
#     -l      -  show the peripheral location and contact
#     -m      -  enable protocol=[ALL|AUTO|NOVELL|DLC|TCP|ETHERTALK]
#     -M      -  disable protocol=[NOVELL|DLC|ETHERTALK]
#     -n      -  show protocols enabled/disabled
#     -o      -  show operational statistics
#     -O      -  show detailed operational statistics
#     -p      -  show protocol statistics
#     -q      -  show card sysDescr and ID
#     -r      -  reconfigure the interface
#     -s      -  show the peripheral status
#     -S      -  show the peripheral internal status
#     -t      -  show connection type (ether/token)
#     -v      -  show combined info (a,A,s,S,l,b,o,p
#     -w      -  what kind of network interface card
#
#
# USAGE:
#
#   jetstat.all  IP_address   or   printer's_net_name
#
if [ $# -eq 0 ]
   then echo "jetstat: needs network_name of printer or IP address"
   exit
fi
PrnID=$1 Stars="*****************************************************"
#
# Is it alive?
# NOTE: if `ping...` use grave accents ` and NOT apostrophes '
#
if `ping $PrnID -n 1 > /dev/null`
   then
   echo "Printer $PrnID responded to ping OK"
   for AdminID in A a b d f i j l n o p q s S t w
   do
       echo "$Stars"
       echo "hpnpadmin -$AdminID $PrnID:"
       /usr/bin/hpnpadmin -$AdminID $PrnID
   done
else
   echo "$PrnID: is not responding to ping."
   echo "nslookup of $PrnID shows:"
   echo
   nslookup $PrnID
fi
```



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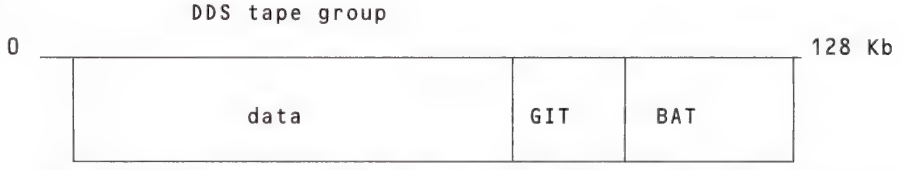
of fbackup with a compression DDS drive?

A: The fbackup man page lists the parameters that can be set in the configuration file and their default values. However, some of the defaults are out of date now that the use of DDS drives rather than 1/2-inch mag tapes or cartridge tape drives is widespread. The parameters were not designed for the second generation of DDS drives such as the HP 2000S (non-compression), HP 2000DC, and HP 4000DC.

Before looking at the configurable parameters of fbackup, it will be useful to check some of the basic concepts relating to DDS tapes. Data is mapped onto DDS tape in groups. Each group is 128 Kb in length and at the end of the group there is a group information table (GIT) and a block access table (BAT) which is a type of index.



The GIT has a fixed length of 32 bytes. The BAT is variable in length and information about its length is stored in the GIT. The data area will vary in size, becoming smaller as the BAT gets larger.

Every entry in the BAT is 4 bytes in length and there is an entry in the BAT for each file marker, fast search marker, and block in the group.

The overheads will mount quickly when the backup consists of many small files. For example, if all the files in a backup were only 10 bytes, then the overhead of a 4-byte entry in the BAT for every file would amount to 40 percent of the available space for each group. By comparison, if the backup consists of 10-Kb files, the overhead of space in each group drops to 0.07 percent.

It should also be noted that the DDS drive has a 5-second window in which data must be flowing. If the flow of data ceases for a 5-second period, the DDS group (128 Kb) will be written, even if it contains only a few bytes of data. This is why data logging (data is written once every few minutes) causes very low tape capacity (as low as 100 megs!). If the system is very busy and fbackup has a poor priority, similar loss in capacity might be seen. Moral: Perform backups on quiescent or single-user systems.

This is a brief summary of the overhead incurred by fbackup. The start of each tape has an ANSI Standard Label area of 1 Kb and a volume Header of 2 Kb. Following that is the file index, which varies in length according to the number of files backed up and the complexity of the directory structures.

Each data file has an overhead of a 1-Kb header and a 1-Kb trailer. In addition, the data is rounded up to the next 1-Kb boundary, which may waste a small amount of space.

The fbackup configuration file parameters and defaults are:

blocksperrecord	16
records	32

checkpointfreq	32
readerprocesses	2 (maximum of 6)
maxretries	5
retrylimit	5000000
maxvoluses	100
chgvol	/usr/adm/fbackupfiles/chgvol
error	/usr/adm/fbackupfiles/error
filesperfsm	200

The fbackup configuration file option is called with: `-c <filename>`. For example:

```
/etc/fbackup  -f /dev/rmt/0hc  -v  -i /users  -c /fb_config
```

If you create a configuration file, you can set the parameters for fbackup to non-default values. You need only list the parameters that you want to change and the others will retain the defaults.

SAM uses fbackup and has its own fbackup configuration file:

/usr/sam/config/br/fbackup_config

The parameters in this file can be adjusted too. Do not delete any that are listed; just add parameters that are not listed or alter the values of the ones that are present.

The parameter that has been shown to have the biggest impact on the performance of the compression drives is blocksperrecord. For most systems, adjusting this parameter to 128 will cause a noticeable improvement in both tape capacity and the time for fbackup to finish on a DDS drive. Some customers have tested fbackup with higher values such as 256, 512, and 1024. These are all legal values for the newer drives at HP-UX 9.0x, but usually 128 will result in improved performance.

Some customers have also increased the value of checkpointfreq to a value of 256. Used in conjunction with the higher values for blocksperrecord, this parameter improves tape capacity but, if used alone, its effect will usually be marginal. The overhead of each check point record is 62 bytes, preceded by an EOF marker. This overhead is within the data area of the group.

The filesperfsm parameter controls the number of files between each fast search mark and has an impact on the time to recover files from a backup tape. During a recovery, the tape streams rapidly to the nearest fast search mark then slows down to check each file, up to the required one.

Setting filesperfsm to a low value means that there will be fewer files between each fast search mark. With older DDS drives this could result in much faster recovery of individual files. With the newer DDS drives, such as the compression drives, recovery operations are much faster than before and reducing the value of this parameter is usually not necessary.

The documented minimum value for filesperfsm is 2 and overhead is 4 bytes per marker. If you back up lots of very small files, and also set the filesperfsm value very low, the overhead will accumulate enough to be noticeable. However, the difference in tape capacity, for a typical full backup with thousands of files, will amount to a few Megabytes.

Fast search markers can affect backup times. The SCSI driver interrupts the normal writing flow to create fast search markers and this can take up to 4 seconds for each one. It's probably best not to alter the default for filesperfsm unless your recovery operations on individual files are really taking a long time. On average, it should take about 1 minute to 3-4 minutes to recover a single file when the filesperfsm is optimal.

The actual performance values achieved with the fbackup configuration file will vary according to circumstances. It is worthwhile for any system administrator with a DDS drive to test several variations of these parameters with their own backups. The blocksperrecord parameter is the best one to experiment with first. Remember to adjust values one parameter at a time and keep records of the actual time (hint: see the time(1) command).

General HP-UX and 9000 questions are answered by Bill Hassell, a support engineer at the HP Atlanta Response Center. He can be contacted via e-mail at blh@hpuerca.atl.hp.com.

Workstations

Q: How can I change the background color of a popup panel in VEETEST. Is there a config file that I can edit that will allow me to configure different colors for my popups? I really need a red popup to get my users' attention.

Continued

A: There is not a config file that you can edit to select different colors for different VEETEST object backgrounds. The */usr/lib/X11/app-defaults/Vee* file will allow you to change the background color used globally in VEETEST. However, at version B.00.00 and above you can achieve the required effect by selecting a bitmap to replace the background on your popup user object. This is accomplished after panelizing by the "Select Bitmap" option in the menu of the panel view of the user object. To create a red bitmap and load it for use in your popup as mentioned above, you could try the following steps:

1. Create a supported bitmap file.

```
hpterm -name RED -fg red -bg red -geometry 48x24 &
```

Then move the window to a position on the screen where it is not covered by any other windows and execute:

```
xwd -name RED -nobdrs -out redmap.xwd
```

Now use the menu on the top left corner of the RED window to close the window. The above steps create a xwd format red bitmap for use with VEETEST.

2. Create a user object and panelize, set it to "Show Panel on Exec". Next, from the panel view choose the "Select Bitmap" option for the menu and load the *redmap.xwd* file that you created in step one. Now you are ready to test and use the popup with a red background.

Selecting bitmaps for a panel view is documented in Appendix A of the *USING HP VEE-ENGINE and HP VEE-TEST* manual.

Q: We recently replaced our old pen plotters with the new HP DeskJet 1200Cs and now our plots come out only in black and white. What must we do to get color plots? We are running the latest BASIC/UX on 300s and 700s.

A: There is a utility supplied with BASIC/UX, documented in the utilities reference section in *Installing and Maintaining HP BASIC/UX* , that addresses your problem. The utility is the bitmap store raster dump Csub. The bitmap store raster dump Csub utility will allow you to dump colorscreen plots to your DeskJet 1200C via pcltrans after storing the plot to a file. *Listing 2* is a sample program using the utility. Notice that my printer name is dj1200 as referenced in the lp -d<printer name> in the listing.

Q: How can I access a printer on the parallel port of my HP 9000/382 running BASIC/UX 6.3? I can access the printer when booted in Rocky Mountain Basic Workstation 6.21 by loading the PLLEL binary and doing a PRINTER IS 9.

A: Direct access to a printer through the parallel interface is not supported through BASIC/UX; however, you may access printers on the parallel interface through BASIC/UX and the HP-UX spooler. For example, if you had a printer named myprinter configured on HP-UX spooler on the parallel interface, you could access it through BASIC/UX with the following command string:

```
PRINTER IS "| lp -dmyprinter"
```

However, BASIC/UX will not flush the output to the printer until the program ends or the pipe is explicitly closed through a command similar to the following:

```
PRINTER IS CRT
```

Q: I am running VEETEST on an HP 9000/382. I am having problems using a barcode reader and would like to know if it is possible to use a barcode reader with VEETEST and how to configure it?

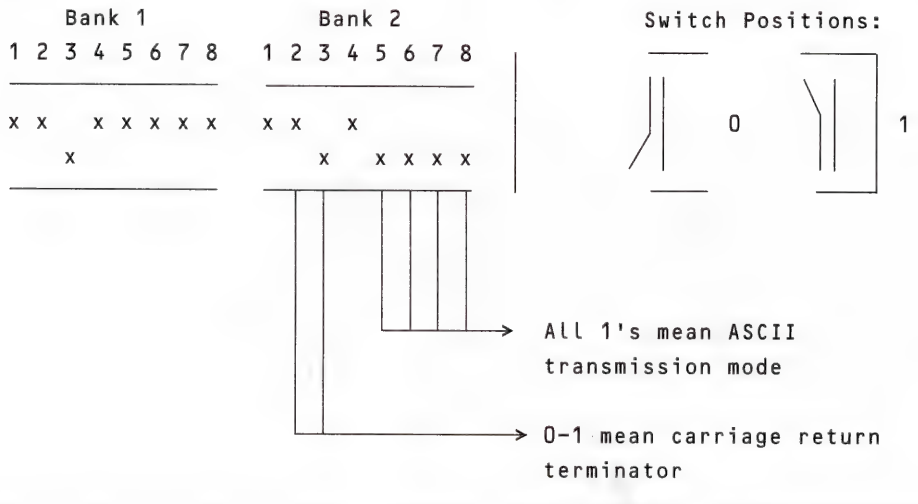
A: You can use a barcode reader to input data to HP VEETEST. To illustrate this let's assume you are using the HP92916A barcode reader. (Currently, this barcode reader can be ordered under part number: E1016A.) To set up the barcode reader to read in data to VEETEST use the following steps:

1. Set the switches on the barcode reader to reflect ASCII transmission mode.
   Set switches 5-8 on the second bank of switches to the '1' position to select ASCII transmission mode. This will send your barcode data to HP VEE as text. (See *Figure 1.*)
   This configuration represents my default. Switches 2 and 3

LISTING 2

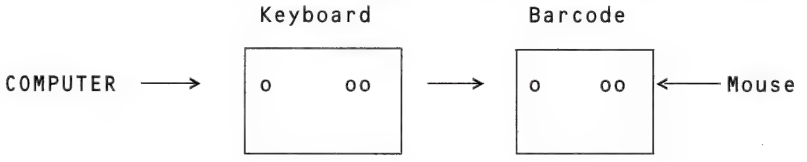
```
10   LOADSUB ALL FROM "/usr/lib/rmb/utils/BITMAP_S"
20   LINE TYPE 1
30   LORG 3
40   LDIR 0
50   MOVE 1,100
60   PEN 1
70   LABEL " ABCDEFGHIJKLM --  white "
80   PEN 2
90   LABEL " ABCDEFGHIJKLM --  RED   "
100  PEN 3
110  LABEL " ABCDEFGHIJKLM --  YELLOW"
120  PEN 4
130  LABEL " ABCDEFGHIJKLM --  GREEN "
140  PEN 5
150  LABEL " ABCDEFGHIJKLM --  CYAN "
160  PEN 6
170  LABEL " ABCDEFGHIJKLM --  BLUE "
180  PEN 7
190  LABEL " ABCDEFGHIJKLM --  MAGENTA"
200  PEN 8
210  LABEL " ABCDEFGHIJKLM --  BLACK   "
220  PEN 9
230  LABEL " ABCDEFGHIJKLM --  OLIVE   "
240  PEN 10
250  LABEL " ABCDEFGHIJKLM --  AQUAE   "
260  PEN 11
270  LABEL " ABCDEFGHIJKLM --  ROYAL BLUE"
280  PEN 12
290  LABEL " ABCDEFGHIJKLM --  MAROON    "
300  PEN 13
310  LABEL " ABCDEFGHIJKLM --  BRICK RED "
320  PEN 14
330  LABEL " ABCDEFGHIJKLM --  ORANGE     "
340  PEN 15
350  LABEL " ABCDEFGHIJKLM --  BROWN      "
360  LORG 1
370  CALL Bitmap_store(600,"| pcltrans -C | lp -ddj1200c -oraw")
380  END
```

FIGURE 1 *Switch Settings*

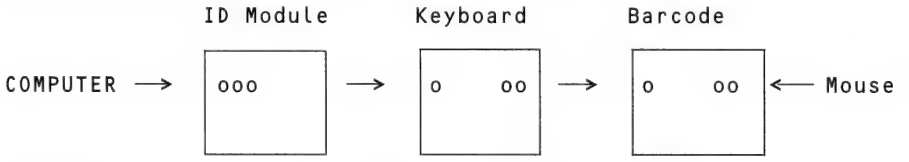


on switch bank 2 control the terminator character. (Mine is set to carriage return.) The other switches control auto recognition parameters. Check your barcode reader documentation for details.

2. You can connect the barcode reader into your HP-HIL loop like this:



You can use an HP46084A ID Module in the loop as well:



3. Edit the *X0devices* file on your S/300 or S/700 to include an entry for the barcode reader.

Change directory to */usr/lib/X11*. As root, edit the *X0devices* file. Near the beginning of the file, in the 'Option 1' section add the following line:

```
first       barcode     other       #    barcode reader
```

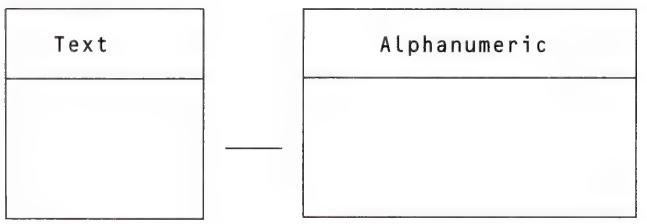
It should look like this:

```
#*********************************************************************
#
# OPTION 1:
      .
      .
      .
#second     keyboard    keyboard    #    second keyboard on loop is X keyboard.
#first      tablet      pointer     #    first graphics tablet is X pointer.
#first      mouse       other       #    mouse will also move the X pointer.
first       barcode     other       #    barcode reader
      .
      .
      .
#*********************************************************************
```

This tells your system that there is a barcode reader in the HP-HIL loop.

4. Once you have configured the barcode switches, plugged it into the HP-HIL loop, and edited the *X0devices* file, reboot your system. This will enable your changes to take effect.

5. Here's a simple VEE program that you can use to test your barcode reader:



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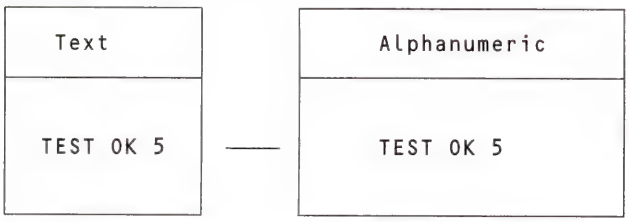
- Place the mouse cursor in the Text object field.
- Swipe the wand over a barcode. (You can use the test barcode that is silk-screened on the back of the HP92916A barcode reader.)
- You will see the barcode's data appear as text in the Text object. (If you use the HP92916A's test barcode, "TEST OK 5" will appear in the Text object.)



Pressing VEE's Run button will transfer the Text object data to the Alphanumeric Display. This will also happen if you turn on 'Auto Execute' in the Text Object's configuration menu. The text will transfer as soon as the barcode is swiped over the barcode label.

Q: I have an HP 9000/735 running HP-UX 9.03 and when I try to use the audio capabilities of my workstation, the sound is barely audible using the internal speaker. What can I do to increase the volume?

A: This is a common complaint when using the internal speaker as the audio output device. The reason is that the internal speaker was never intended as anything more than a typing aid bell. Its location inside the workstation can block typical audio output, especially in a noisy environment, while the bell frequencies are heard easily. You can help this by running */usr/audio/bin/acontrol* and increasing the volume of the output, but the fact still remains that the internal speaker, about the size of a half dollar, was not intended for this use.

The best approach is to use audio headsets or external speakers with your workstation. Inexpensive external speakers are stocked at all computer supply stores these days. You can switch the workstation from internal to external speakers through the SPEAKER environment variable as follows:

for Korn, Borne, and POSIX shells

```
export SPEAKER=external
        or
export SPEAKER=e
```

for C shells

```
setenv SPEAKER external
        or
setenv SPEAKER e
```

Rudy Stanley, an applications support engineer at the HP Response Center in Atlanta, Georgia, answers workstation questions.

HP 1000 Guru

Q: I am trying to change the Receive Packet Filter permanently on my 12076A LANIC using Node Manager. I am using the following command:

```
SC,,4,0,P
```

to change the Receive Packet Filter from four to zero, but after rebooting, the value has returned to four. It does not make it permanent. I know I can do this manually every time I reboot, but why does it change? Is there an easier way than Node Manager to set it?

A: What is misleading here is that NSINIT resets the packet filter. So it appears that NM or the LAN card is failing to set the packet filter permanently, when in reality, NSINIT is resetting it.

The packet filter setting is determined by NSINIT, and depends upon the link type set in the DCN. For example:

```
*DCN: 015.037.241.004,LAN,,38
```

will configure the LANIC for both 802.3 and Ethernet packets. This assumes you want both PROBE and ARP to work and sets the packet filter to 6 (PROBE requires Multicast; ARP requires Broadcast. Individual always. 6 = I + M + B).

On the other hand:

```
*DCN: 015.037.241.004,803,,38
```

will configure the LANIC for 802.3 only and set the packet filter to 4 (PROBE only, so you need only Multicast and Individual, 4 = I + M).

See the *Node Manager Manual* (p/n 12076-90002) for more information on the packet filter settings.

So that explains why it changed. NSINIT makes an intelligent decision based on information you supply. But you can always change it, as long as you are aware of the ramifications.

Here's an easier way than using Node Manager to change the packet filter, using a control request:
Add to the welcome file AFTER NS has been initialized:

```
CN,lu,37B,0,-20465
```

Where LU is the LAN card LU, 37B is the function code, 0 is the desired packet filter setting, and -20465 is a security code.

This is from the 12079A DDA manual (p/n 12079-90001).

Q: I am confused by the S and E bits of Driver Parameter 8 for SCSI MO drives. I am unable to get the system to spin down the MO when I dismount it, and I am

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also unable to prevent users from manually ejecting a Mounted MO during use. How do I implement these features?

A: When you are inserting an MO-disk, the drive will spin up. Spindown is also taken care of if you press the eject button. This is all hardware within the disk itself.

In order to allow D.RTR and the driver to handle spinup/down/eject *and* also lock the MO from manual ejection during use, two items need to be addressed:

1) The MO disk must be genned with either bit 15 OR bit 14 set in Driver Parameter 8. Bit 15 (the S bit) means the driver will spin the drive down on last dismount (last implies there is more than one LU genned for the platter). Bit 14 (the Eject bit) means the driver will eject (after spindown, of course) upon last dismount. Setting bit 15 overrides bit 14. In other words if you set 15 and 14, the driver ignores 14.
2) D.RTR needs to be linked with DDMAX.REL modified for control of spindown/eject. In the VCPLUS directory, find the file DDMAX.MAC. Edit this file and look near the end for:

```
-------------------------------------------------------------------
* By default, this feature is disabled. Set the following value to -1
* to enable this feature. (Note that this also requires that all of
* the MO disk LUs on the same node list must be genned with the same
* driver parameter 8 setting either the 'S' or 'E' bit.)
d.scsi_mo_eject dec 0    ; disable scsi 40b/41b mode,
*
* d.scsi_mo_eject dec -1   ; enable scsi 40b/41b mode,
*
-------------------------------------------------------------------
```

You want to uncomment the last line, and comment the preceding line. Then run MACRO on the modified DDMAX.MAC source and link D.RTR with this modified DDMAX.REL.

Note that this applies *only* to the CDS version of D.RTR supplied with VCPLUS. It is not supported with the non-CDS version of D.RTR supplied with RTE-A.

What this gets you is the following:

When dismounting (the last volume in the node list), the MO will either spin down and eject, or just spin down, depending on the setting of bit 14 or 15 in DP 8.

Conversely, when mounting an MO, D.RTR will spin the drive up. In addition, when the MO is mounted, the front panel eject button will be disabled, preventing manual eject of the MO during use.

Q: I have a C1511A HP-IB DAT tape drive on my system. If I rewind the tape from the system and ask it to go OFFLINE, it does not eject the tape after rewinding. Is this normal behavior?

A: Yes, this is normal behavior for the HP-IB DAT tape. The SCSI

LISTING 1

```
ftn7x,q,s
      program id()

      implicit none
      integer trimlen
      integer idadd, buf(3), lu
      character str*6
      equivalence (str, buf)

      call exec(29, 6hSLEEP , 0, idadd, -1)
c                 ^        ^  ^      ^
c                 |        |  |      |
c                 |        |  |      searchflag - if present and
c                 |        |  |      sign set, search every ID seg
c                 |        |  |      in system, no matter what
c                 |        |  |      session it is in.
c                 |        |  |
c                 |        |  id seg address - returned id segment
c                 |        |  address or 0 if not found.
c                 |        |
c                 |        session - ignored if searchflag is
c                 |        present and has sign set.
c                 |
c                 program name

      if (idadd .eq. 0) then
        write (1,*) 'SLEEP not found.'
      else
        call idaddtoname(idadd, buf, lu)
        write (1,*) str(1:trimlen(str)), '/', lu, idadd
      endif
      end
c
```

controller DAT tapes will respond to an UNLOAD command from the system and actually unload the tape after rewinding.

Unfortunately, the HP-IB version requires manually unloading the tape.

Q: Is there a simple way to find out the ID segment address of a program without knowing the session number? IDGET works, but it searches only the local session or the system session.

A: Sure. The program in *Listing 1* uses an EXEC29 call, which has existed for some time and is now documented in the *Programmers Reference Manual* as of 6.1. The EXEC29 has been around since 1982 or so, just not documented. ◧

Questions for HP 1000 Guru are answered by Walt Boeninger. He is a senior support engineer in the HP Mountain View Response Center. He has had seven years in the field supporting RTE systems and five years in the Response Center focused strictly on RTE and 1000 system hardware.

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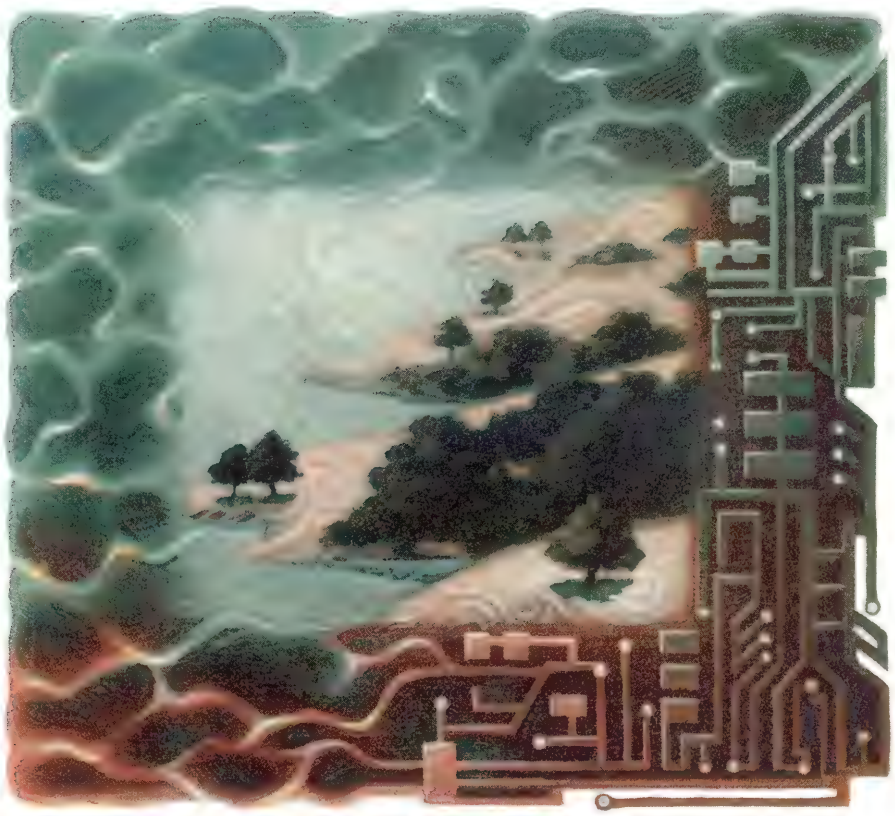
CIRCLE 101 ON READER SERVICE CARD

Client-server Process Control Over a WAN



Client-server applications over a LAN are tough enough. What do you have to watch out for when you deploy a client-server application over a WAN?

This article covers how EBMUD extended its HP 1000-based SCADA/process control system with the addition of client-server-based "CIM/21" software on HP 9000 Series 700 workstations.

WAN upgrades, loading, back-up, and client-server implications across the low-speed WAN links will be discussed. We will briefly review the features of CIM/21 from Industrial Systems, Inc. (ISI), and focus in on client-server safeguards of the entire process control system.

The original SCADA system, called the OP/NET System, consists of paired HP 1000s at five Area Control Centers (ACC) linked to a pair of HP 1000s at the Oakland Control Center (OCC). The ACCs each poll and control 40 to 60 Remote Terminal Units/PLCs located throughout the service area. The OP/NET System currently monitors and controls about 8,400 points spread around 300 facilities.

East Bay Municipal Utility District (EBMUD), based in Oakland, California, treats and distributes an average of 220 MGD of water for 1.2 million people spread over 325 square miles in Alameda and Contra Costa counties. In the water distribution service area, the OP/NET System monitors and controls:

Illustration by Karen Tokmakoff

by Kevin B. Wong

- 175 reservoirs (almost one billion gallons of treated water storage)
- 135 pumping plants
- 24 rate control valves
- six filter plants

The OP/NET System also monitors five weather stations in the 575-square-mile Mokelumne watershed in the Sierras and also controls:

- two hydroelectric plants with three turbines each
- two chemical feed plants and six safety release stations along the three aqueducts between Walnut Creek and Campo Seco.

The original OP/NET System, which is based on Fisher Controls' GV1000 SCADA software, has been fully operational since January 1989 (see *Figure 1*).

Background: Original System Layout

The Area Control Centers have changed very little over the past six years even though 35 new Remote Terminal Units (RTUs) were added and the I/O point count increased from 6,100 up to 8,400. A fourth MUX, along with PCIF and Fisher code, was added to each of the four ACCs in the East Bay to accommodate monitoring and control of Programmable Logic Controllers (PLC) in the treatment plants.

The five ACCs all have very similar configurations. HP 1000 A900 series computers are paired for redundancy and drive the following peripherals:

- two operator color workstations (2397 compatible)
- two printers, one plotter, and a tape drive
- 10-12 modems
- a mirrored pair of 571-MB disk drives

The A900 computer boxes include *(Figure 2)*:

- six MB of RAM
- four 8-channel serial MUX cards
- one DS/1000 HDLC network card (9600 Baud)
- one DI/DO card for watch dog time out switch over
- one Parallel Interface Card for CPU to CPU handshaking
- one Async card for system terminal
- four HP-IB cards to talk to disk drives, tape, plotters, and clock

The ACCs are networked to the OCC in a star point-to-point configuration. The ACCs can function "stand-alone" if the OCC or associated communications links are down. Each ACC monitors and controls 40 to 60 RTUs in its geographic area and passes data up to the OCC. The OCC can pass down commands and pump control schedules to the ACCs.

The OCC HP 1000-A990s (A900s upgraded to A990s in December 1992) are configured as follows *(Figure 3)*:

- have 12 MB of RAM
  - five DS1000 HDLC cards
  - three 8-channel serial MUX cards
  - nine HP-IB cards, one async, one DI/DO, and one parallel interface card
- share six 571-MB disks
  - four printers, one plotter
  - two tape drives
- drive 10 operator stations

The OCC has limited external access that enables a user to dial in and view OP/NET screens with a Vectra 286 and special video hardware.

The GV1000 provides comprehensive SCADA control with RTU communications (multiple types and protocols), real-time process display graphics, trends, alarm management, I/O database management, logs, process calculations, and pump control.

The Lay of the WAN

ACC-to-OCC DS1000 network communications were originally set up with 9600-baud synchronous modems through EBMUD's microwave communications systems. Parallel analog leased lines were added to provide a redundant communications path. These analog lines were

FIGURE 1 *Geographical Layout of OP/NET ACCs to OCC*

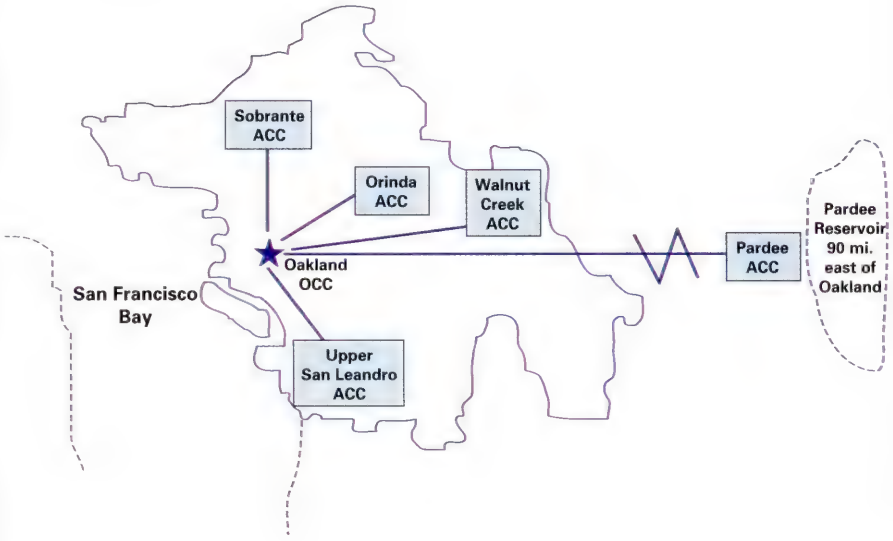
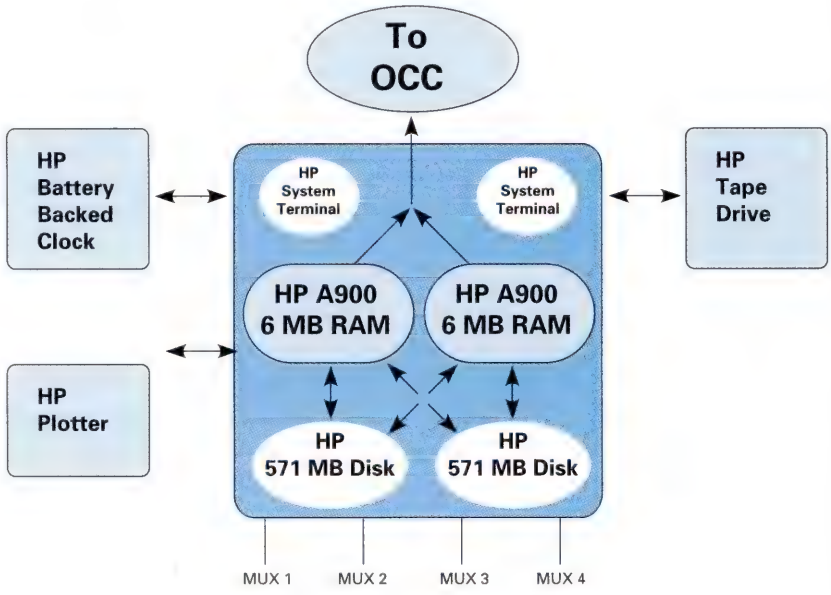


FIGURE 2 *Typical Area Control Center Layout*



upgraded to 56-kbps digital circuits in mid 1991 when the OCC was relocated to the—then new—administration center. The monthly recurring cost increased only about 15 percent for this upgrade. DSU/CSU's with a 4-channel synchronous serial multiplexer were installed with the DS1000 using one channel at 9600 baud. We would essentially be utilizing only 17 percent of the bandwidth over the next two years, but the added reliability of the digital circuits has been well worth the added expense. 9600 baud has proved to be very adequate for communications between the ACCs and OCC. Exception data typically is transmitted in short bursts every 6 to 15 seconds and the occasional file transfer takes a few minutes. (See *Figure 4.*)

In actuality, the HP 1000 with GV1000 software operates like a "closed system" client-server architecture with distributed processing over a proprietary network.

The ACCs take care of RTU communications, maintain a local historical archive, and can operate completely stand-alone without the OCC. The OCC also does parallel processing on the "exception" data coming from the ACCs. Each ACC can only monitor/control the RTUs/PLCs that it polls and controls.

The OCC with the original A900s' response time was growing slower and slower due to CPU loading. The A990s brought the CPU loading back down to a level of reasonable performance. I/O point growth was constrained before the A990 upgrade.

The Changing WAN

The OP/NET System Capacity Improvements (OSCI) were approved in December 1992. The four components consisted of:

Continued

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CIRCLE 12 ON READER SERVICE CARD

FIGURE 3 *Oakland Control Center—HP 1000 A990 Arrangement*

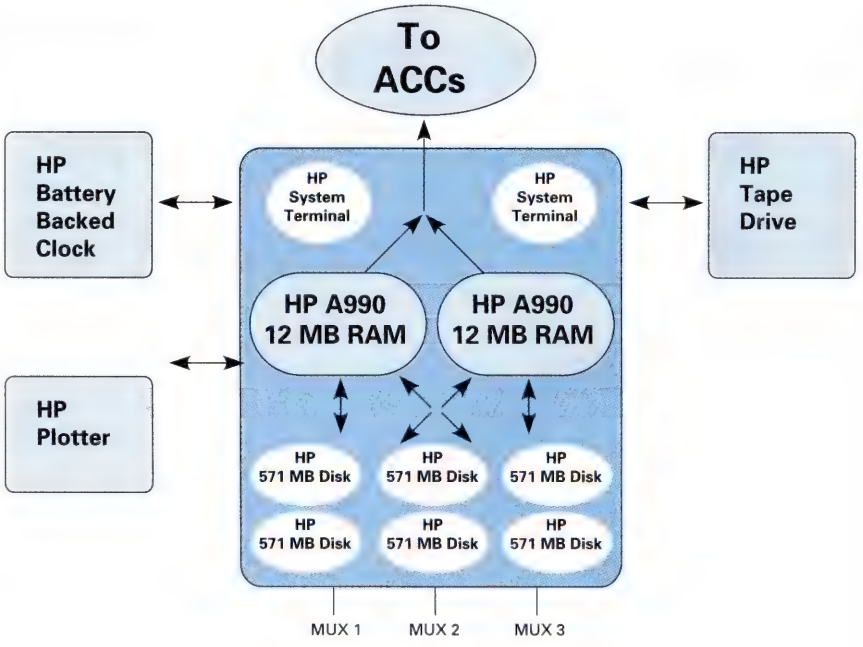
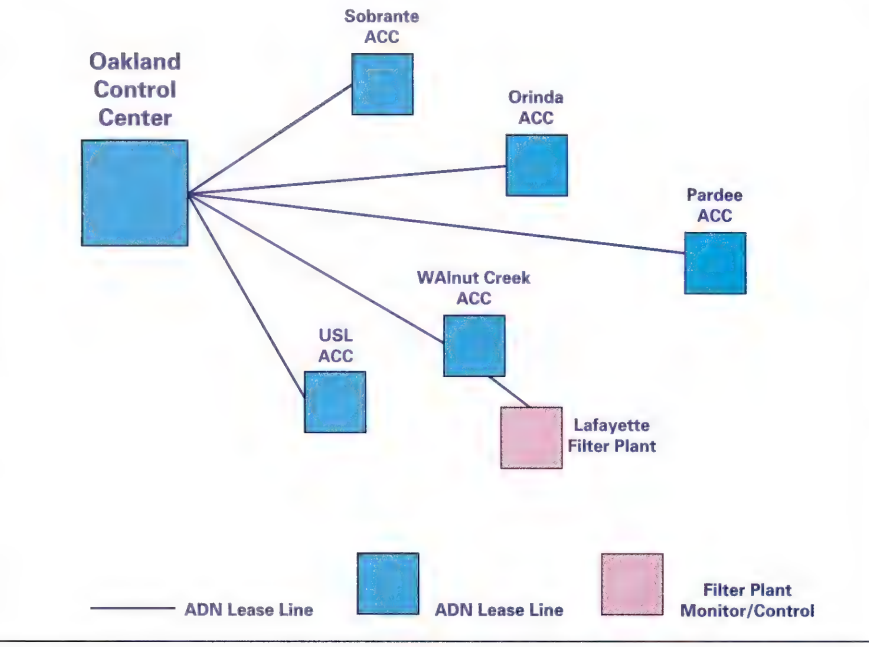


FIGURE 4 *OP/NET's Advanced Digital Network (56-kbps Links)*



1. WAN equipment, training, installation, and testing
2. HP 9000 755, 715/50 workstations, X terminals, and associated peripherals and LAN equipment
3. software and ISI integration services and ISI integration services and support
4. HP-UX training and HW/SW support

OP/NET engineers directed and provided overall integration for OSCI.

The existing 56-kbps digital leased lines were beefed up with MICOM NetRunners to handle the existing DS1000 9600-baud links, bridge Ethernet, and add voice (telephone hot lines) between the OCC and ACCs. The original four-channel MUX were bypassed and the full 56 k was piped through the NetRunners to compress the voice and data and use fast packet cellular switching. In other words, the 9600-baud links no longer use Time Division Multiplexing but utilize only bandwidth during data burst, and data is squeezed about 50 percent with RLL compression. The voice channel utilizes between 4.8 and 16 kbps during usage and adjusts dynamically and will use the full 16 kbps if available. Three kbps are utilized for management overhead at 56 kbps. The Ethernet bridge typically provides about 100 kbps with compression. Throughput utilization went from 17 percent to about 200 percent. About 10-12 kbytes/second of Ethernet data can pass. The NetRunners were also tested at 9600 baud and will still pass 2-3 kbytes/second of data with no telephone hot line usage and the DS1000 data still pulsing between the ACC and OCC. (See *Figure 5.*)

Continued

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FIGURE 5 *OP/NET Wide Area Network*

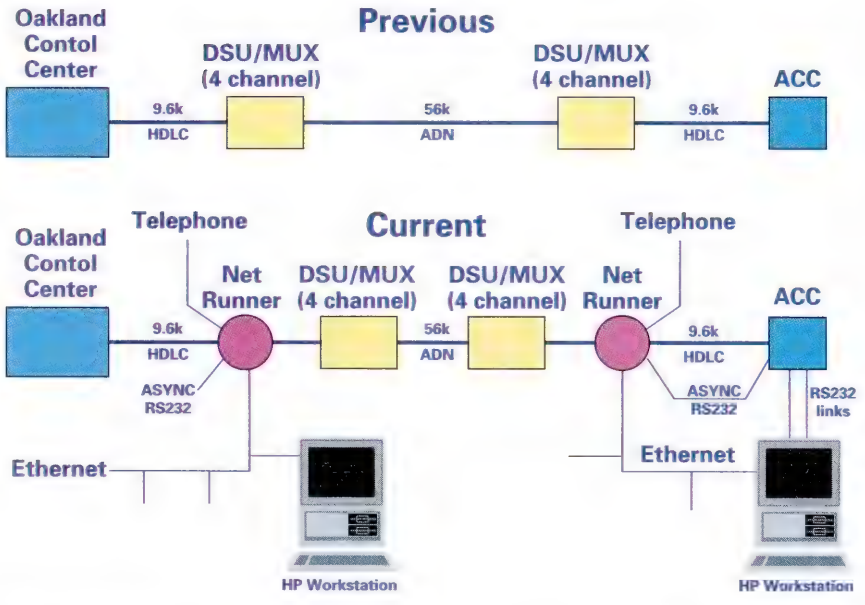
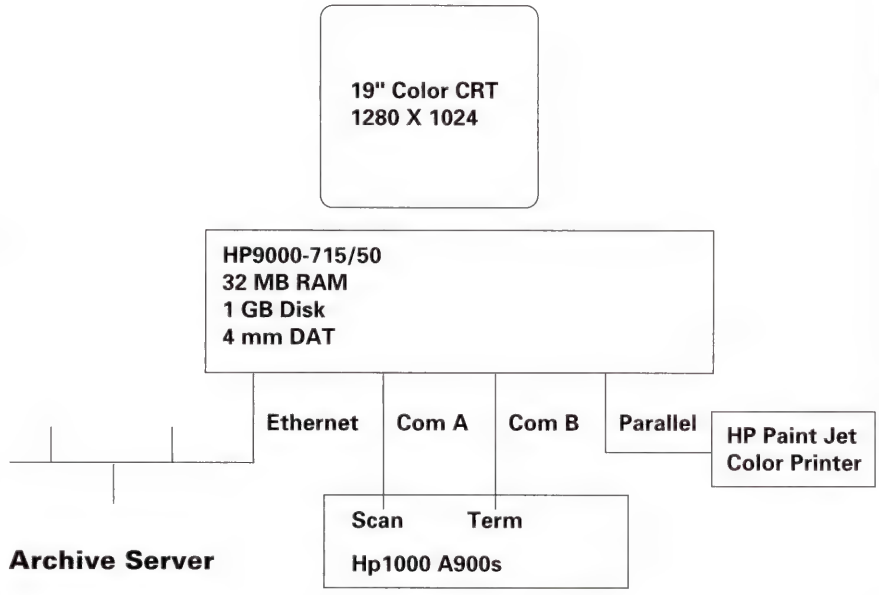


FIGURE 6 *CIM/21 Area Control Center Workstation Layout*



Added Bonus

One HP 9000 715/50 workstation with a 1-GB disk, DAT, 32-MB RAM, and 19-inch color monitor was deployed to each ACC *(see Figure 6)*. Both serial ports were connected to the HP 1000 MUX ports. One serial port was dedicated to passing GV1000 OP/NET data to the CIM/21 scan module in the workstation. The second serial port is available as a "Kermit" terminal connection to the HP 1000. We can now telnet out to any ACC workstation across the WAN and establish a "local" terminal session with the HP 1000 via Kermit. Everything works great, although EDIT/1000 works only in line mode. These "local" terminal sessions have greatly enhanced Fisher and our ability to troubleshoot and support the GV/HP 1000 without the telnet CPU load on the HP 1000. Instead of ftp, we use Kermit or DS copy to transfer files. A modem has always been available on the OCC HP 1000. I have actually had sessions to all five ACCs opened at once on a single workstation. X Window is great!

CIM/21

The OSCI project originally had two primary goals:

1. Offload the OCC HP 1000-A990s to accommodate future I/O point growth and extend the life of the original system.
2. Make OP/NET System data more accessible to other EBMUD personnel such as planners, maintenance support, engineers, and management.

ISI's theme for CIM/21 is "Open Access o Process Information." CIM/21 is an "open systems" client-server process data archive with extensive distributed

The Night Owls

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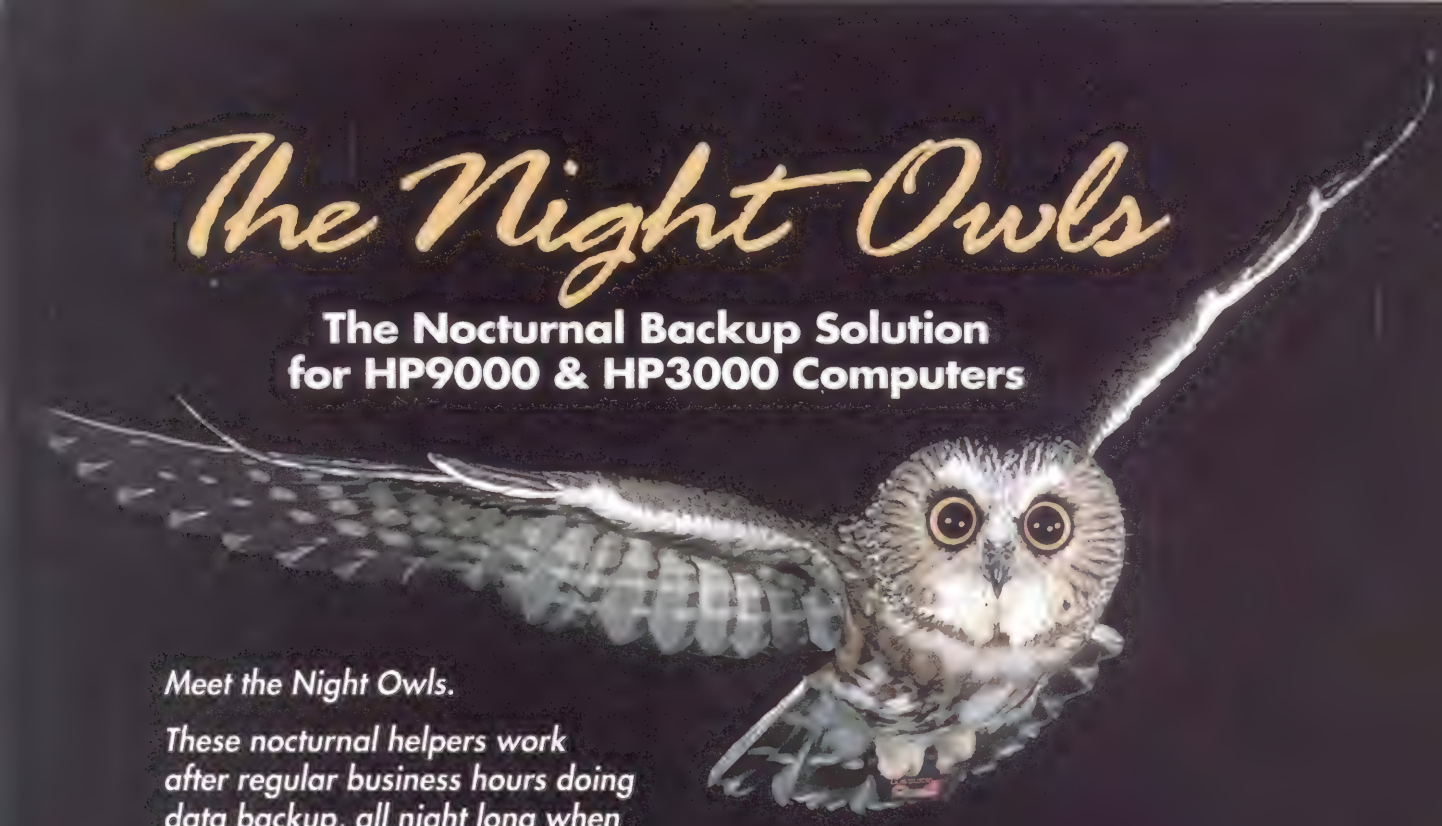

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FIGURE 7 *CIM/21 Server Layout at Oakland Control Center*

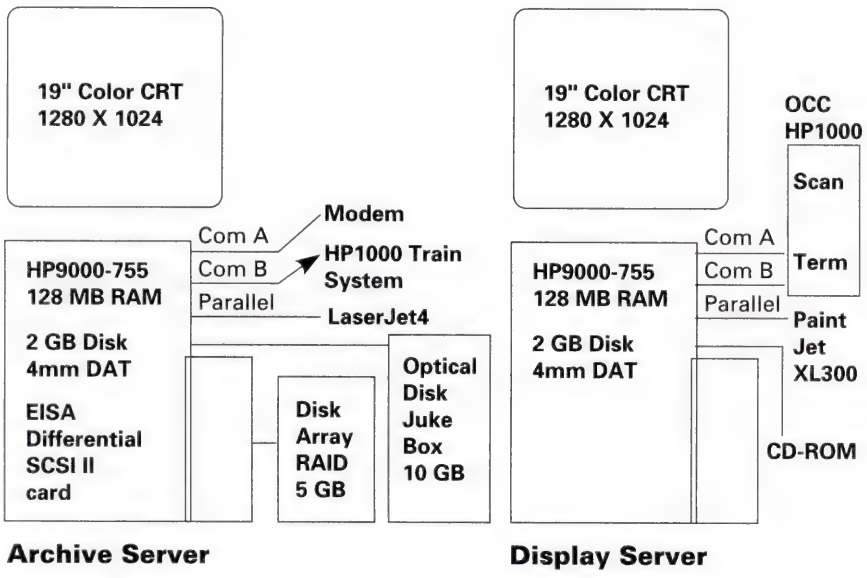
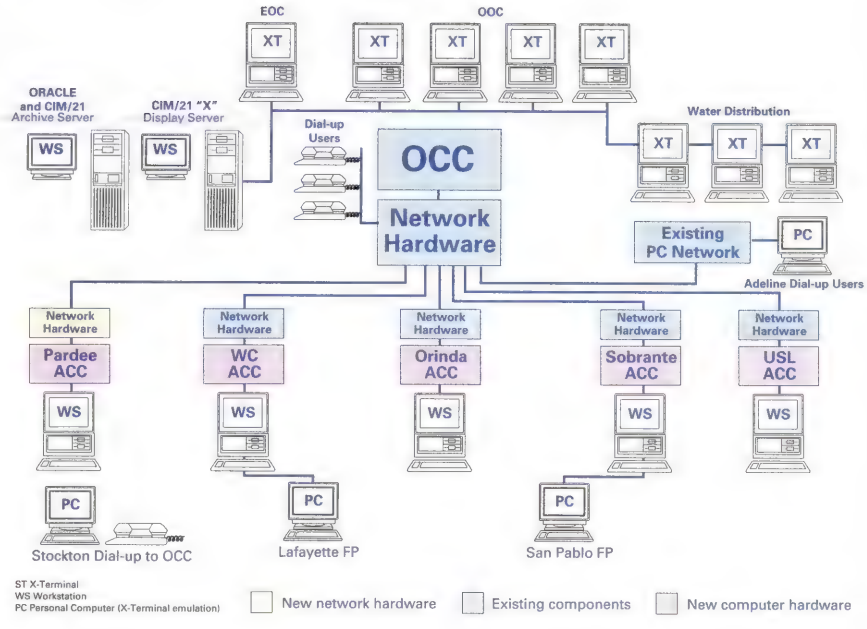


FIGURE 8 *OSCI CIM/21 OP/NET Overview*



processing. CIM/21 has many parallels to GV1000. Real-time process display graphics can have embedded trends. Trending and data archive capabilities are much more extensive, having been built around a high-performance archive compression engine. CIM/21 also adds SQL-Oracle (or Sybase) integration with the ability to push or pull data directly to or from the RDBMS. CIM/21 also adds more analytical tools such as SQC statistics and a spreadsheet. HP-UX and the associated software on a typical system support open-systems features such as X Window, TCP/IP, networking (Ethernet), client-server tools, Telnet, and ftp.

CIM/21 is very modular and is designed for distributed processing with minimal network loading. Each ACC HP 9000 715/50 workstation has a scan module and a graphics module.

ISI developed the communications "scan" software modules for the HP 1000/GV1000 side and HP 9000 side. CIM/21 scans the real-time process image of GV1000 every ten seconds (scan rate configurable). Any process values or point status values that have changed from the previous scan are passed across the 9600-baud serial link to the HP 9000-715 workstation. The workstation scan module forwards these "exceptions" across the WAN to the archive server.

Each ACC monitors/controls 1500~1900 I/O points. Typically, about 50 to 90 values change every 10 seconds. The serial link usually takes a few seconds to transfer the changes to the HP 9000 scanner and the WAN link takes a fraction of a second to forward the data to the archive server in Oakland.

The Graphics module in each workstation utilizes a local disk copy of

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"process graphics," "tag lists," and menus. Process graphics and tag lists typically update every five seconds with process information. Thus, only process data is fed across the WAN link when a user calls up a process graphic or tag list. The user is now able to access data from the entire system, whereas before, GV1000 would show only data collected locally at that ACC. The graphics module also supports X11r5 and thus X-terminals can access a workstation.

In fact, the graphics server in the OCC, an HP 9000 755 workstation with a 2-GB disk, DAT, and 128 MB of RAM, drives many X-terminals and PCs running X-emulation in the Oakland headquarters and many remote sites (non-ACC). (See *Figure 7.*) The graphics server minimizes the X-terminal load on the archive server typically to one or zero users and also serves as a "cold" redundant standby server that can easily be switched over to act as the archive server. Just move the SCSI cable over from the 5-GB disk array and run a short script. The HP 9000 715/50 on my desk also serves as a "cold" redundant standby for the ACC workstations.

WAN/LAN Disruptions

CIM/21 has backup buffer mechanisms to buffer scan data in the event of a LAN or WAN failure. Scan data in the HP 9000-715 scan modes will automatically buffer to disk with time stamps already attached when the WAN or LAN link goes down. The buffer will automatically flush to the archive server once the link is restored. The buffer size is configurable and should currently handle over two days of process data changes.

The HP 1000 scan module also has a local buffer in the event the workstation, CIM/21, or the serial link is down. This buffer will automatically flush once the HP 9000 scan module starts requesting data again. This buffer is sized to hold about four hours of data .

In the event of a 56-kb leased line failure, the NetRunners can be moved over through the 9600-baud synchronous modems on the microwave system, if need be. We also maintain a spare NetRunner in our stock. Alternative plans for higher speed Ethernet WAN links through the microwave system are under consideration.

Conclusion

Mechanisms such as local buffering are essential for client-server and distributed processing to minimize data loss when the WAN, workstations, software, or network equipment fails.

CIM/21 and the OSCI project have met the two primary goals and operate very reliably and robustly with only partial redundancy. The HP 1000s with GV1000 will still be in full use for at least the next four or five years and the HP 9000 workstation and CIM/21 provide a major horsepower boost for future applications and sharing data (*Figure 8*). ◧

Kevin B. Wong is an OP/NET system engineer with East bay Municipal Utility District. He participated in the design, start-up, and support of the OP/NET system eight years ago. He has been immersed in LANs, WANs, HP-UX, HP workstations, and CIM/21 the last two years.

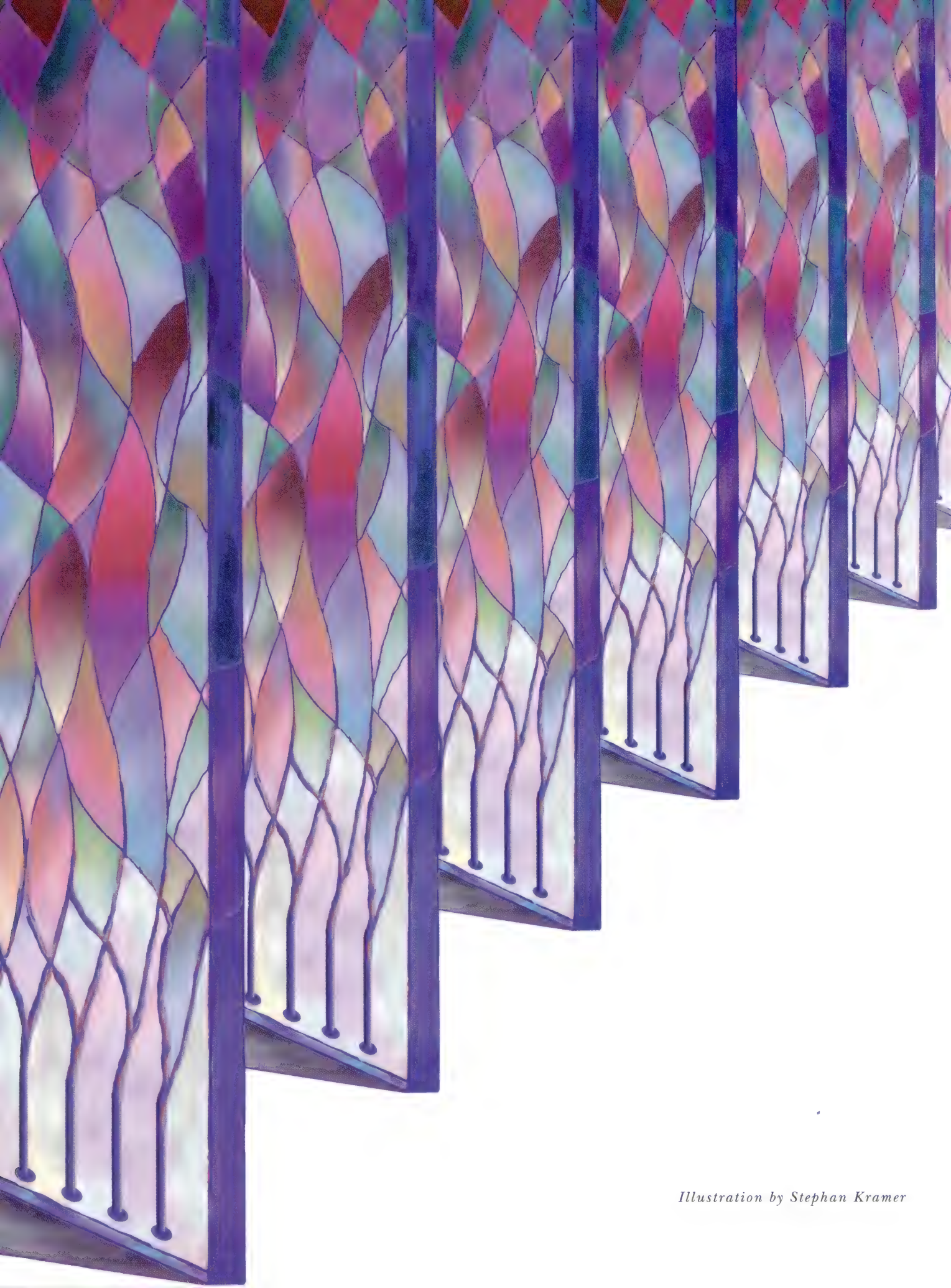
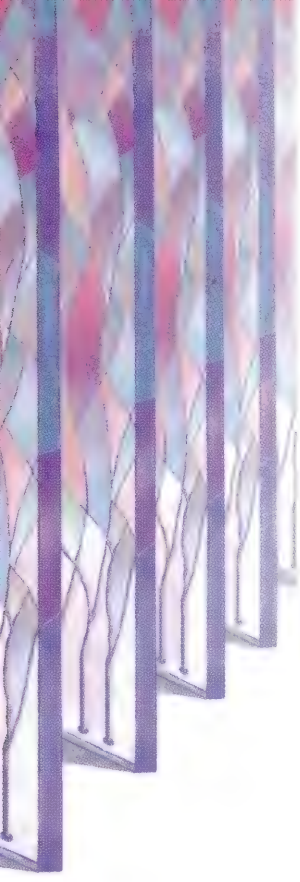


Illustration by Stephan Kramer



An Introduction to Threads

by Mark DiPasquale

What are user threads? What are kernel threads? What is the value of threads from an application point of view? If you ever have questions like these, or if you get them from someone else, the information in this article will help you. In this article, I will describe user threads and kernel threads, and discuss their advantages and challenges. You will learn specific definitions and see examples, and we'll take a look at how threads can improve application performance. Read on! By the time you are done with this article, you'll know enough to be dangerous!

Where computers are concerned, solutions for business needs come in the form of applications (at least in part). Applications come in many forms, from word processors to online transaction processors (databases) to compute- intensive simulators, and more.

Applications are made up of one or more programs. Programs are made up of code for the computer to execute. Code is generally executed in a sequential manner. However, a threaded program has the potential of increasing overall application performance in the areas of throughput and response time through parallel and/or asynchronous code execution.

Parallel code execution is accomplished by executing two or more parts of a program on two or more processors at a given time. Asynchronous execution can be accomplished by switching to another code segment to execute when the one executing becomes blocked for some reason. Threads enable the programmer to take advantage of these features and more.

Other benefits of threads include shared resources and fast creation, termination, and context switch times. All of these contribute to increased application performance as well as conservation of the system-wide resources.

The Program, the Process, and Scheduling

In this article, we will examine the benefits of threads in more detail through the use of several illustrations. To provide a reference point for some of our discussions, we will begin by defining a program called *change_up*. Change_up is a program that reads information from a file, modifies it in some useful way, and then writes that information to a database record. We might picture an unthreaded version of change_up as diagrammed in *Figure 1*.

When a program becomes active on the system, either executing or as a candidate for execution, it is referred to as a "process." Several operating system resources are allocated to manage the process when it becomes active, including a process table entry, a user area, a unique register context, virtual memory, and more. Most operating systems support processes

FIGURE 1 Change_up *Unthreaded*

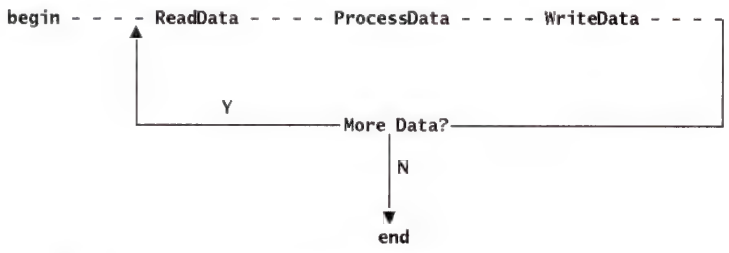
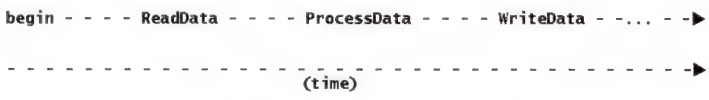


FIGURE 2 *Execution Time, Single-Threaded*



only. Processes may be viewed as "single-threaded" entities; that is, they execute only one flow of instructions in a sequential manner.

Processes are scheduled to run over and over again until they terminate (i.e., the program is completed). When scheduled, a process will run on one processor for one time-slice. A time-slice is simply an amount of time that a process is allowed to execute before the operating system checks to see if there is a higher priority process ready to run. A new process is scheduled to run in place of the current process when:

- the current process's time-slice expires
- the current process blocks, sleeps, exits, or is preempted

It is interesting to look at the execution of change_up with respect to time. Being single-threaded, this application can run on only one processor at a time and may run only in a sequential manner (see *Figure 2*).

One way to increase the speed at which change_up executes would be to buy a faster computer! Another way to increase change_up's speed would be to spread the work across multiple processors. This is where threads come in.

Threads

In this section, you will learn the definitions of user and kernel threads, you will learn how threads relate to processes, and you will develop a high-level understanding of how threads work. A threaded change_up program is presented that demonstrates the advantages of parallel code execution. Let's begin by defining user threads.

User Threads

In an operating system that supports user threads, an application can be supported as multi-threaded; that is, multiple threads of execution may exist within a process. However, a limitation of user threads is that only one thread, representing some portion of the overall program, can execute at a given time. When a threaded process is scheduled, the context of a user thread within the process is, in a sense, "plugged in," and the process executes on behalf of that thread. If a thread blocks or completes, another thread from the same process may be scheduled in its place, providing the process's time-slice has not expired.

User threads can be created by application programmers using the threads APIs provided in the threads library. These APIs allow programmers to create, terminate, and synchronize threads within a process. The threads library may also contain a scheduler for user threads. User threads are not directly visible to the kernel; they are visible only in user space. Thus, a user thread must be associated with a kernel-schedulable entity (i.e., a process) in order to get access to a processor. One other thing to note: In this model, processes, not threads, are the schedulable entities.

A good definition for user threads is found in the term: "Many to One (M×1). This definition is derived from the nature of the implementation: many threads may exist in a process, but only one may execute at a given time (see *Figure 3*).

Kernel Threads

In a kernel threads operating system, processes are no longer the schedulable entities; instead, threads are the schedulable entities and processes are only logical containers for threads. Thus, if an application is running on an operating system that supports kernel threads, each thread within the process may run on a different processor because the kernel is capable of scheduling them individually.

Kernel threads are created by the threads library using thread system calls. These system calls allow the threads library to create, terminate, and synchronize kernel threads. Kernel threads are visible to the kernel as well as to the threads library. The kernel schedules and manages these for its own needs and on behalf of user threads in need of kernel services.

There are two forms of kernel threads, and thus two definitions.

One to One (1×1): In the 1×1 model, there is one kernel thread for every user thread on the system. In this model,

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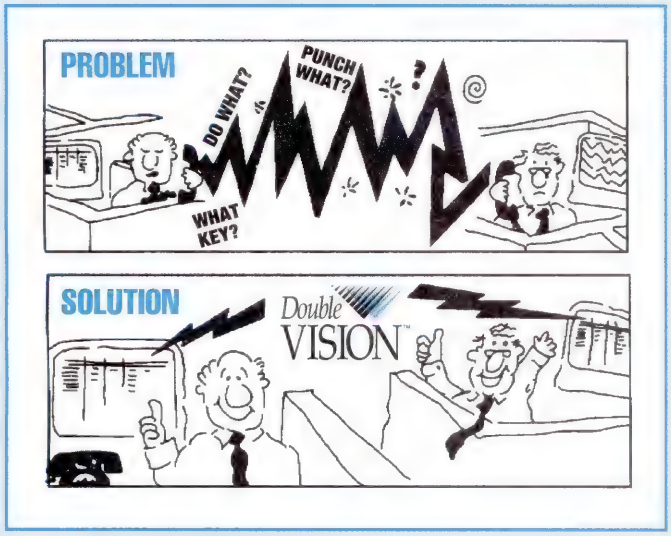

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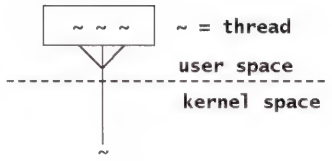
FIGURE 3 *User Threads*

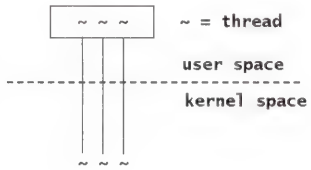


threads, not processes, are the schedulable entities, and each thread within a process may be scheduled on a different processor. Therefore, the 1×1 model supports parallel processing (see *Figure 4,* top).

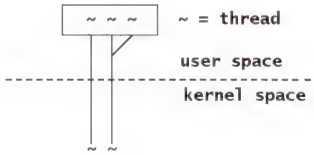
Many to Many (M×N): This model is the superset of the M×1 and 1×1 models described above. The M×N model supports one kernel thread for every user thread, multiple user threads multiplexed on top of a single kernel thread, or any number of combinations. Finally, since the M×N model is a "kernel threads" model, it supports parallel processing (*Figure 4,* bottom).

FIGURE 4

Kernel Threads, One to One.



Kernel threads, Many to Many



A Threaded Change_up

One of the advantages of an operating system that supports kernel threads is the ability to run a threaded application's code concurrently over multiple processors. Thus, if we take our change_up program and thread it, execution could look something like the diagram in *Figure 5.*

In this illustration, each routine is represented by a unique kernel schedulable entity (threadx, thready, and threadz). Notice how the start times of each routine differ slightly. This is because WriteData can't do any work until ProcessData has processed some data. Also, ProcessData can't do any work until ReadData provides data to be processed. Still, it is possible for all of the routines to begin working in parallel once the data is flowing. Finally, notice that the "end" time for the threaded change_up is less than the "end" time for the process model version of change_up. The advantage of parallel code execution is higher application throughput—higher performance!

Please remember that this illustration represents an ideal situation. It is ideal because we are assuming that our routines (ReadData, ProcessData, and WriteData) all received access to a processor in a timely manner. Other threads from other processes also compete for the available processors.

The Advantages of Threads

The overriding advantage of threads is performance. However, performance is an earned quantity, not a given. Some applications will benefit from threads while others will not. As they say, "your mileage may vary."

Aside from parallel processing, there are a number of advantages for user threads as well as kernel threads. Here they are:

Asynchronous Code Execution

Since multiple threads of execution exist within a threaded program, it is possible for another thread, from the same process, to be scheduled to execute in the event that a currently running thread blocks. This increases the probability that the associated application will execute faster. However, there are some things to consider. For example:

- In the user threads model, some "blocks" will block the whole process and a different process will be scheduled.
- In a kernel threads model, it is possible that a thread from another process will be scheduled when the current thread blocks.
- In either model, a thread may block and there may be no other threads ready to run within the process, for any number of reasons.

Thus, a performance increase is not always guaranteed; nevertheless, the use of threads may increase the probability of better performance.

Shared Resources

Threads share most of the resources in a process. They share access to files, shared memory, and the process virtual address space. Hence, the use of threads enables programmers to conserve system resources. Performance may benefit also because sharing resources among threads requires less management than sharing among processes.

Thread Operation Speed

Threads have much less context than processes; therefore, thread operations are generally faster than similar

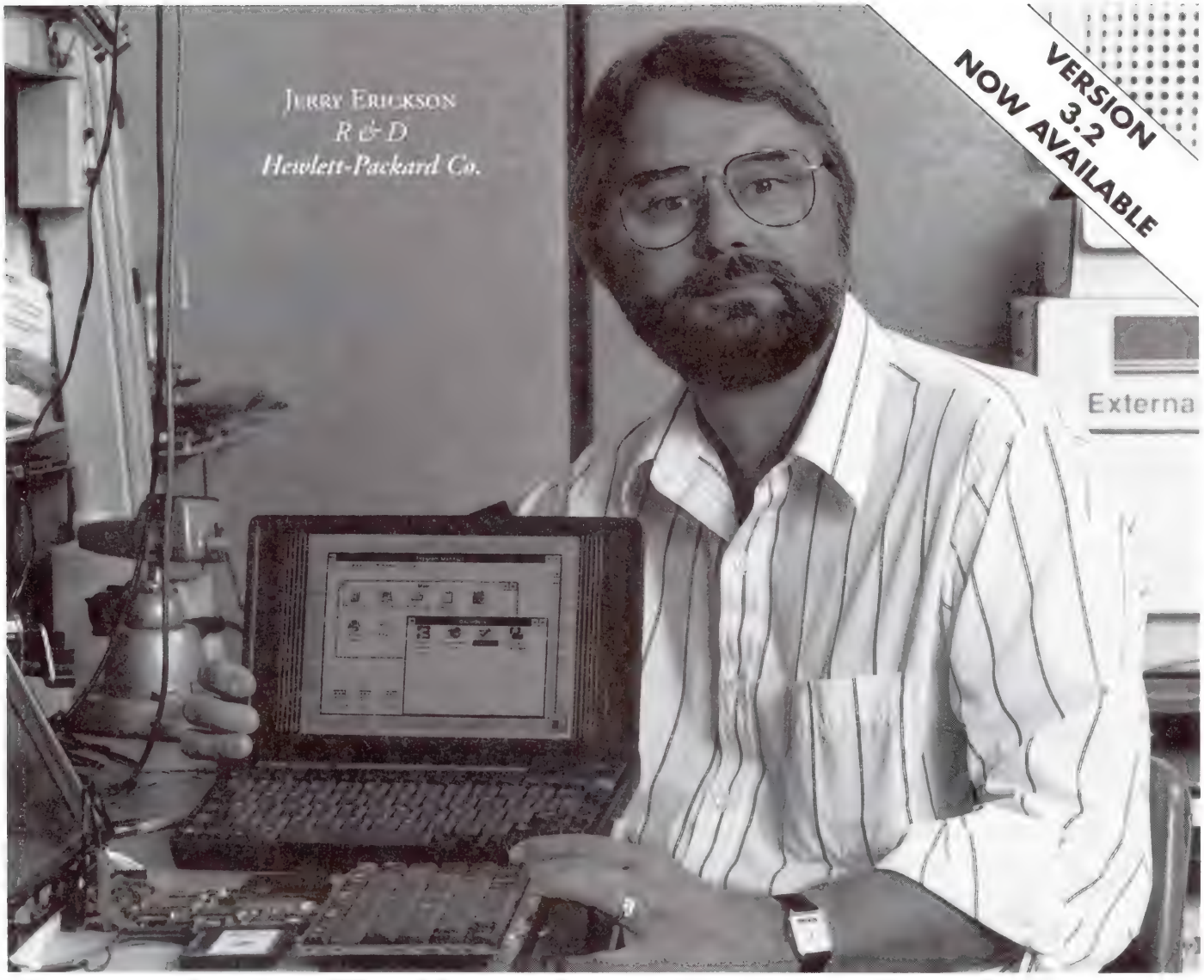


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FIGURE 5 *Threaded* Change_up

```
begin-threadx(ReadData) ..................running on processor 1
        thready(ProcessData) .............running on processor 2
          threadz(WriteData) .............running on processor 3
                    end
-------------------------------------------------------------------►
                        (time)
```

operations on processes. More specifically, thread creation, termination, and context switch operations are faster with threads than they are with processes.

Response time

If it is possible to separate operations in a program, threads may be used to increase application responsiveness. For example, let's say you are using an e-mail utility. In a single-threaded version, while saving an e-mail message you may notice some delay before the user interface is refreshed. This is because the program is first doing the I/O to save the message and then refreshing the screen (sequential operations). However, if this application were threaded, one thread could manage the I/O while another managed the user interface. These operations could proceed in parallel, thereby increasing responsiveness.

Natural Programming

This advantage has nothing to do with performance, but it is important to mention. In some applications, the designer may need to use goto statements and other such methods to circumvent the sequential limitations of traditional programming. However, with threads, one is not locked into the sequential execution model. Hence, sequential programming limitations may be solved with more intuitive, less complex approaches.

Potential Problems with Threads

Complexity

While it is true that programming with threads may provide more "natural" ways to solve problems, there are other things to consider. For example, when you maintain, debug, or profile a threaded application, multiple flows of code execution, as opposed to one flow, must be understood. It is generally much easier to debug and optimize a single-threaded program.

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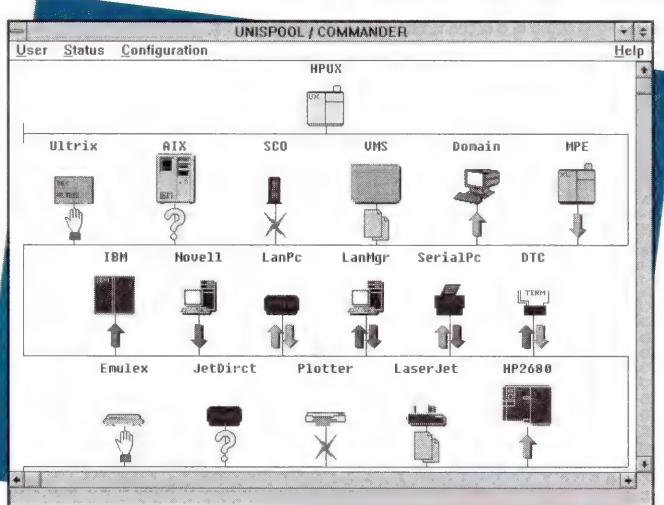

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Availability/Maturity of Tools

To increase the growth of threaded applications, the industry will need to create refined debuggers and profilers. However, threaded debugger/profiler technology is relatively young, adding to the short-term challenge for application developers.

The POSIX 1003.1c Specification

The POSIX.1c specification has not yet been made final. Hence, there are several threads APIs a programmer can choose from when designing a threaded application. The "potential problem" with this situation is the resulting lack of application portability. This is a problem for both developers and, in the long run, customers. On the bright side, the POSIX 1003.1c specification should be made final during the latter half of 1994. This emerging industry standard will ease the burden of application developers seeking to write a single version of a threaded application. Moreover, use of the POSIX APIs will protect customers' investments in applications, provide for vendor choice, and provide for interoperability in heterogeneous system environments.

CONCLUSION

The use of threads in application development may have the reward of increased application performance. An increase in application performance can be a significant competitive advantage; however, application robustness and portability are important considerations too. Developing robust threaded applications is possible with the right developer training and with proven tools that help with program maintenance. Developing highly portable applications is possible when the industry aligns with standards. The standard for threaded application development will be defined by POSIX 1003.1c. ◧

Mark DiPasquale is HP-UX Product Manager, OSSD Marketing. He provides strategic marketing and technical planning for the HP-UX operating system. As a support planner he planned the support strategy for two standard HP-UX releases, two B1-level secure releases, and two releases of DCE. He has also co-developed several HP-UX technical courses.

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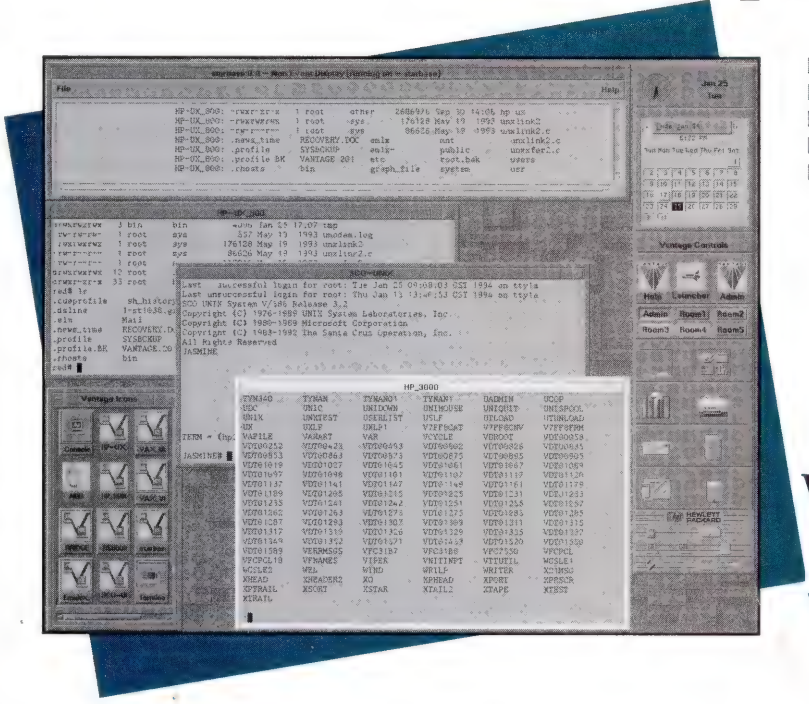

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Hardware Review

by Sean Reifschneider

HP 9000 Model 712

EARLIER THIS YEAR THERE was much excitement surrounding Hewlett-Packard's launch of a new workstation aimed towards the personal computer market. This high-performance, low-priced machine was code-named the Gecko and for a while everyone had newt fever.

Features

The 712 workstation is based on the recently introduced HPPA 7100LC CPU, HP's latest generation of RISC processor. The 7100LC has a simplified floating point processor, which is compensated for with other features such as on-processor MPEG video decompression and the ability to run with either little-endian or big-endian bit ordering. For many, the most attractive feature of the 712 is its price—$3,995 for a complete machine including monitor, keyboard and mouse, 16 MB of RAM, and a 260-MB hard drive.

An effort to reduce the complexity of using the 712 resulted in the Soft Power-Down feature. When you press the power switch on the front of the box, a message is sent to the kernel telling it to shut down. Once the kernel has brought the system down and flushed file-system buffers, the machine powers down. This allows a user to turn the machine off at the end of the day without needing to know the root password or the commands needed to halt HP-UX.

At-a-Glance

Hewlett-Packard 9000 Model 712 workstation

712/60, 15-inch 1024x768 monitor, 16 MB RAM, 260-MB drive

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Workstation Sales: (800)637-7740

HP First Fax Retrieval: (800)333-1917

Datasheet Fax ID:	32207
Photo card Fax ID:	32210
712-735 Price guide:	34048

Price:

$3,995

Hardware

The back of the 712 is full of places to plug things. Included in all machines are

- 10baseT and AUI network
- single-ended SCSI
- parallel printer
- 2 PS/2 connectors for the mouse and keyboard
- 9-pin RS-232C
- 15-pin SVGA
- headphone, microphone, and line-in ports

Also included are two expansion ports that can be used to add things such as a second serial port or an ISDN interface (though no HP-IB card is currently available).

The case is pizza-box style and comes with a stand for either desktop or tower configurations. No tools are required to get inside the computer. Opening the case is a simple matter of pressing outward on two plastic locking tabs and sliding the two halves of the case apart.

The two internal drive bays (one for a 3.5-inch SCSI hard drive, another for the optional PC-type 1.44-MB floppy drive) also require no tools. Drives are sandwiched between two pieces of Styrofoam and held securely in place with a metal clip. The foam enclosures have large cutouts for cooling and so far I've not experienced any problems with running the drive 24 hours a day for months.

Inside the case there are four SIMM

slots for RAM. The base system comes with two 8-MB SIMMs, allowing you to add two more for 32 MB without having to scrap the existing RAM. If you order 32 MB from the factory, you have the choice of 8-MB or 16-MB denominations. The latter saves you about 13 percent if you don't need 64 MB down the line.

No HP-HIL? That's right, the 712 comes with PS-2 connectors for the keyboard and mouse. I was expecting to be displeased with the PC-type keyboard (which HP seems to require you to purchase with the computer) but have been very happy with it. My biggest complaint about most PC keyboards is the layout, but that was quickly changed by using the *xmodmap* utility under X Window.

The bad news is that HP-BASIC won't run unless it can find an HP-HIL port on the machine. However, with some remapping of function keys you can use the 712 as an X-terminal for running HP-BASIC on a machine that does have HP-HIL.

Software

The 712 comes with HP-UX Instant Ignition. This makes the initial setup very quick. I went from a bunch of boxes to talking to other machines on the network in less than half an hour. Instant Ignition is available only in the Desktop version on the 260-MB drive, which reduces drive space requirements by getting rid of some filesets (most notably UUCP). All other drive configurations come with the Runtime (full) Instant Ignition.

To take advantage of the hardware MPEG viewing, your only alternative at the moment is HP's MPower. The publicly available MPEG viewer I had uses software decompression and struggled to keep up with MPower. MPower is quite capable of running a 320x200 30 frame per second video clip enlarged to 640x400.

The NextStep operating system is currently available on the 712 and porting Windows N/T has been talked about from day one. Also available are WABI and SoftWindows for running Microsoft Windows and DOS applications and the Macintosh Application Environment for running your Mac programs on the 712.

Performance

The 712 initially came in a 60 and an 80i version running at 60 and 80 MHz, with the 80i being optimized for integer operations. Since its introduction, the 80i has been upgraded to an 80 model that gives you roughly 30 percent better performance all around than the 60.

Given that HP seems to be marketing the 712 for the high-end PC crowd, I ran a Fast Fourier Transform benchmark on a 486DX2-66 PC running Linux and the Gnu C compiler version 2.5.8 against the 712/60 using the same compiler and flags (-O2). Using this benchmark showed the 712 as being just over twice as fast as the 486. With the prices of Pentiums dropping like a rock, that is hardly a fair comparison.

A PC starts to move rapidly away from the 712 in price the more you move away from the $3,995 package. For instance, the upgrade price from a 260-MB to a 520-MB hard drive is more than what you'd pay to purchase a 520-MB SCSI drive for the PC without having to trade in a 260-MB drive. The monitor upgrades are priced similarly.

Supportability

While the people I talked to at the support center seemed to expect a support agreement, my hardware questions were answered after I explained that the machine was less than a week old and I had made an effort to find the answer in the supplied manual set.

HP-UX support has been exceptional. The HP SupportLine offers e-mail (support@support.mayfield.hp.com) and World Wide Web (http://support.mayfield.hp.com) access to patches and other support information (for more information see the HP-UX Systems Administration column in the March 1994 issue of *hp-ux/usr*).

Summary

Hewlett-Packard's 9000 Model 712 workstation provides excellent performance for the money. If you have a reason to run HP-UX on a machine that's competitive with the high-end PCs, the 712 is the machine for you. If you primarily plan on using NextStep or one of the OS emulators such as Macintosh Application Environment, a PC or Macintosh could be a better solution. ◧

Sean Reifschneider (jafo@tummy.com), based in Colorado and currently on long-term assignment in Omaha, Nebraska, specializes in HP-UX systems administration and portable C programming. Mainly he's just enjoying working with computers and the people who work with them.

HP-UX Systems Administration

by Chris Curtin

Creating a Series 700 Recovery Tape

SURPRISINGLY ENOUGH, ONE OF the most overlooked areas in systems administration is disaster recovery. With the Series 700 HP-UX workstations, HP has provided a very simple and effective way to recover from typical problems such as lost root passwords, deleted */hp-ux* files, and missing boot information.

The idea for this column came from a request to the hpux-admin mailing list for help on how to recover */hp-ux* after it was deleted by a user. The standard way of booting from */SYSBCKUP* was not available because it too had been removed. (The author hinted at someone looking for disk space.)

The first step in recovering from a disaster must be done before the disaster occurs. If you do not have a recovery tape, then you must reinstall the operating system. If you own a Series 700, please take 10 minutes and create a recovery tape. You may never need it, but the one time you do makes it worth the effort.

A recovery tape contains a copy of your HP-UX kernel and a small root disk. It contains enough information and executables for you to boot your system and look at your root disk. If you can repair your root disk, you'll find that it also contains a copy of your kernel so you can boot your root disk.

Making a recovery tape is very easy. You do not need to be in single-user mode or tie up the tape drive for hours.

The first step is to log in as root. Second, determine the type of tape drive to store the recovery system on. Most common on a 700 is the DDS or DAT drive. You can also create a recovery system on a cartridge drive, but you cannot create one on a 9-track drive.

Now determine the device file for your tape drive. (I created a recovery tape on a 712/80 with a DAT drive on */dev/rmt/0m*.)

Next check if */etc/mkrs* exists. If it does not, locate your HP-UX distribution media and load the *SYS-ADMIN* fileset.

The mkrs command has the following syntax:

```
/etc/mkrs [-v] [-q] [-s] [-f<tape>] [-r<root>] [-m<series>]
```

The -v option instructs mkrs to be verbose and tell you what it is doing. The -q option instructs mkrs to do a quick build. This option requires about 6 megabytes of disk space in */tmp*. If you do not use this option, mkrs will have to use the tape drive for storage and the generation will take a couple of hours.

The -s option instructs mkrs to generate a small recovery system for systems with minimal memory. If you are creating a DAT recovery tape you must use the -s option. (If you do not, mkrs will add it for you.)

The -f option defines the tape drive location. In my case it was */dev/rmt/0m*. (You must replace the <tape> space holder with the device location.) The -r option defines the root disk location. In my case it was */dev/dsk/c201d6s0*. The -m option defines the type of recovery system to create. Valid values for <series> are 700 for the series 700, 300 for the series 300, and 400 for the series 400. (Unfortunately I do not have a Series 300/400 to try this on. Please check the series-specific documentation.)

The command I used to create a recovery tape was:

```
/etc/mkrs -q -v -s -f/dev/rmt/0m -r/dev/dsk/c201d6s0 -m700
```

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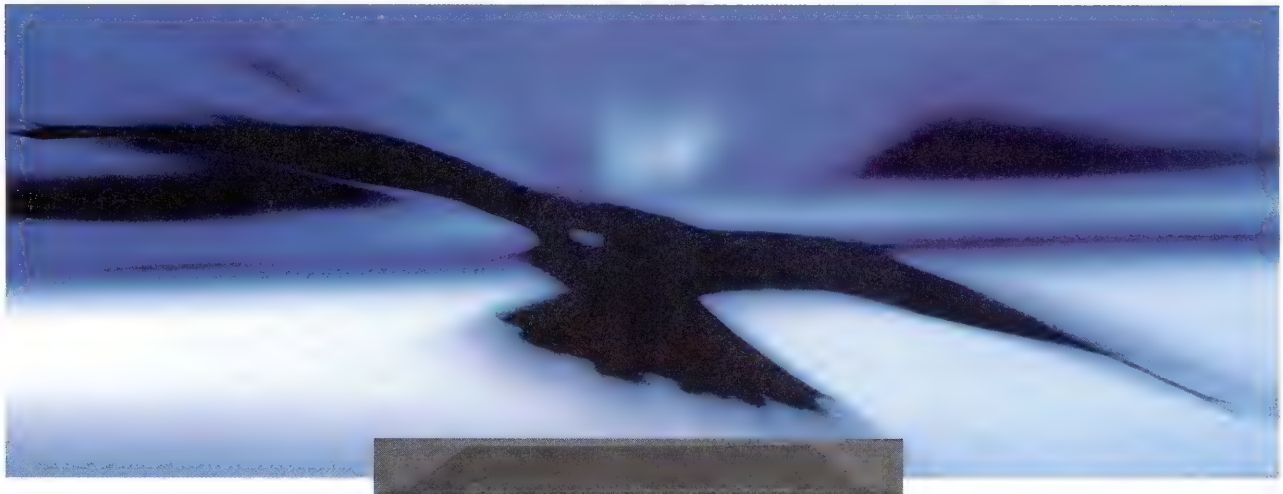

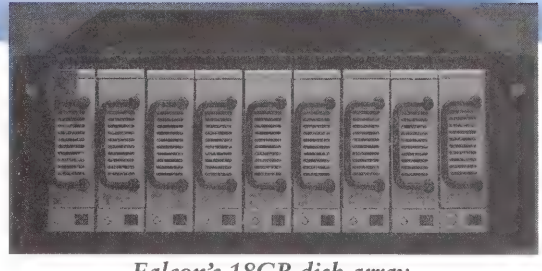

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CIRCLE 155 ON READER SERVICE CARD

The command took about five minutes to finish.

The mkrs command notes the location of your root disk and swap partitions. If you change the memory or swap setup of your system, you must create a new recovery system. Otherwise, when you use the recovery system data, your root and swap disks can be overwritten.

To finish the recovery system, put a label on the tape and get a copy of the booting instructions to keep with the tape. The *System Administration Tasks* for the Series 700 contains the instructions (or keep a copy of this article, because I am going to discuss booting a recovery tape in the next section ;-)). Likewise keep a copy in your notebook.

You can make multiple recovery tapes if you wish. I would recommend keeping one with the computer, especially if the computer travels. (Our workstation has more Frequent Flyer Miles than I do.)

Booting the Recovery Tape

I'll start by hoping that you never have to do this. But there are several reasons why you may want to:

1. You lost the root password.
2. Someone deleted */hp-ux* and */SYSBCKUP* so you cannot boot.
3. Something major happens to your root disk configuration.
4. Your root disk is destroyed or has electrical or mechanical problems.

The first thing to do is make sure all your cables are connected and everything is plugged in. I'm not kidding. A "bad disk" may have had its connector knocked loose or the SCSI terminator may be missing!

Next reboot your system. As it starts to boot, use the Space Bar or escape key (Esc) to interrupt the boot. Which one you use will depend on the hardware. On the 712/80, I used the Esc key.

You will be prompted with a series of options. Again the options will vary by system. One should be called "Search." If you do not have a Search option, look for a command that locates bootable disks.

Run the Search command. It will check all your disks and return a list of valid disks. One will be your tape drive. On the 712 the tape drive was reported as an HP HP35470A. Next to the tape drive is a scsi address for the drive. This is what we will boot from.

Next tell the hardware to boot from the tape drive. On the 712 I used "Boot scsi.??" The "??" characters are the address from the Search command. The tape drive should be accessed and the recovery system booted. This takes about 5 to 10 minutes.

The recovery system is actually running in memory. It creates a virtual file system and mounts your root disk under */disc*. Next, the recovery system runs `fsck -p` on the root disk. This might fix all your problems, but probably not.

Depending on the size of your root disk the fsck may take as long as an hour. On my system it took 10 minutes. (By the way: you cannot damage an existing system by booting a recovery tape *if* the recovery system is up to date. See my comments at the end of the previous section.)

If fsck encounters any problems or abnormalities, it may ask for your input. I usually answer Yes to everything because if this does not work, you will have to reinstall.

When the fsck is completed, you are presented with the following options:

1. Remove root password
2. Work in shell to recover manually
3. Automatically recover
4. Exit system and halt
5. Help

The first thing to do at this point is to look at the help data. It tells you what each function does and any pitfalls or warnings.

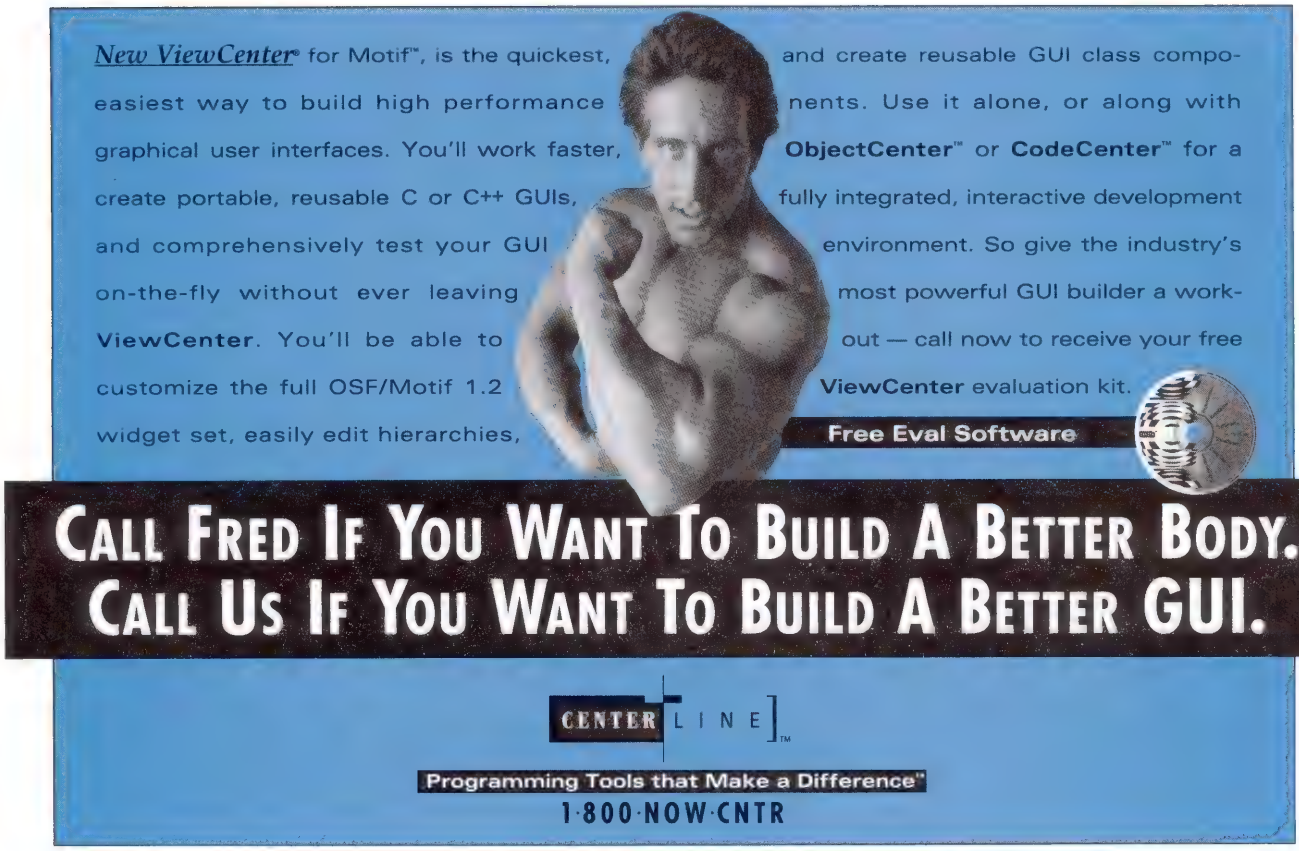
If you lost your root password, option 1 will remove the root password from the */etc/password* file and leave everything else alone.

Option 2 creates a shell in the recovery system so you can look at your root disk. Your root disk is mounted under */disc*. You can then look around to determine why your system will not boot or to replace your kernel or other missing file.

If you need to replace a file, copy it from the virtual file system to the */disc* file system in the correct location. If you cannot determine what was wrong, exit and use option 3. To exit use Control-D.

If you cannot determine what is wrong, or lots of stuff got trashed, use option 3. This option will automatically replace the following files with valid files from your recover system:

/hp-ux
/etc/fsck
/bin/cpio
/etc/init
/etc/inittab
/etc/passwd



CIRCLE 145 ON READER SERVICE CARD

/bin/sh
/etc/mkboot
/usr/lib/uxbootlf.700
/lib/dld.sl
/lib/libc.sl

Also, the boot area is replaced and minimal device files are created. When a file is replaced, a copy of the original file is placed in the */tmp/recovery.xxxx* directory. The xxxx is replaced with the month and day of the recovery. This way when the system boots you can copy back any files that may still be OK. However, I recommend you just forget about the old files and delete them.

If you choose to fix the system by hand or do so automatically, your primary goal at this point is to get the system to boot from the root disk. Do not try to recover files from your backups or mount other disks from the recovery system.

Option 4 exits from the recovery system and halts the computer. You should now be able to boot from the root disk.

After you have recovered the missing files from your backup or fixed any other problems you have, create a new recovery system. You probably did not change anything, but I would rather be safe than sorry.

The following is dangerous, but if it is your only hope....

If you have an identical workstation that is still working, you can make a recovery tape on it and try to boot it on the other system. If you succeed, when the root disk boots, immediately rebuild your kernel and back up the system. Next use */etc/update* to replace the core operating system on top of your current root disk. Make a new recovery tape and then make one for every workstation you have!

If the workstations are not identical, you may corrupt your root disk when the recovery system tries to mount it, so use this only as a last resort.

Swap Space Revisited

A couple of columns ago, while discussing swap space, I forgot to mention that */tmp/syscore* must exist if you are going to create a core file after the system panics.

Next time I hope to have a similar discussion on how to recover an 800 whose root disk is trashed. Keep the e-mail coming; I am always looking for topics that an administrator might be interested in. ◧

Chris Curtin, a software developer for Bradley Ward Systems, Inc. in Atlanta, Georgia, specializes in device driver development for factory automation on the HP 9000. He can be reached via e-mail at: chris@bwilab3.atl.ga.us.

X-Watch

by Larry Headlund

Another Look at TCL

READERS WITH LONG MEMORIES will recall that in the July 1993 X-Watch column I examined TCL, the Tool Control Language created by John Ousterhout. At that time I was not too enthusiastic. Recently I took another look and have some more news to report.

Briefly, TCL is an interpreted language like LISP or the Korn Shell that was designed to be the glue holding other program modules together and as an embedded language for use inside programs. As an interpreted language it breaks free of the code- compile- link-test cycle. Because it is an embedded language, the programmer doesn't reinvent a language every time he needs one. Not only does a small, efficient language that can be embedded save the original programmer time and trouble, but a common language makes life much easier for the next programmer who comes along.

Closely allied with TCL is Tk, also authored by John Ousterhout. Tk is a set of widgets like Athena, Motif, or OpenLook. While Tk widgets could be used with C or C++, the marriage of Tk and TCL to create an interpreted GUI environment is the most common mode.

So why don't I like TCL/Tk? Basically I didn't find TCL that exciting a language. I also didn't want to leave the world of Motif with the contributed widgets, standard ways of doing drag and drop, etc. for the different world of Tk. Not that there isn't a world of contributed code and standards with Tk. Far from it. It is just that it is a different world.

Why another look?

Two things drew me back to TCL. A major one is that TCL is rapidly becoming a standard for embedded languages. One of the links first mentioned for the Fresco project from the X consortium was TCL. There have been several published projects using TCL. Rare for a countability language, it is even showing up in commercial products. For example, it is the programming language embedded in one of Telebit's new modems. This wide use of one language was one of Ousterhout's original goals for TCL, and the wide adoption of TCL is a tribute to the power of his conception and a tribute to the excellence of his implementation. All this means that a programmer can expect to have to deal with TCL sometime and would be wise to become familiar with it.

I still might have continued to resist if it hadn't been for a contribution from Jan Newmarch (jan@pandonia.canberra.edu.au). What he has done is provide a TCL binding for Motif. This yields an executable called *moat* that accepts TCL scripts for creating Motif GUI interfaces. This Motif binding was especially important to me because part of my work is with Xtty, a product that enhances Motif so it can be used on regular character terminals. Now I can write one TCL script and have both a X terminal and a character terminal interface.

Making it all work

The TCL/Motif binding is available from *ftp.x.org:/contrib/devel_tools/tclMotif.1.2.tar.gz*. It requires tcl7.3 or better and Motif 1.2.x. TCL can be found at *ftp.cs.berkeley.edu/ucb/tcl/tcl7.3.tar.Z*. The TCL package uses the *./Configure* script in its home directory

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CIRCLE 158 ON READER SERVICE CARD

LISTING 1

```
#!/bin/ksh
#    sphfileRead.s:    prompt for basefile name and run SQL

BaseFile=`/usr/local/bin/moat -name "Base File Name" <<End
   xtAppInitialize

   xmSelectionBox .sb managed \
      -selectionLabelString "BaseFile Name" \
      -dialogType DIALOG_PROMPT

   .sb    cancelCallback {
      exit 0
      }

   .sb    okCallback {
      puts -nonewline stdout "%value"
      exit 0
      }

   .sb.Help   unmanageChild

   . realizeWidget
   . mainLoop
End
`
if [ -n "$BaseFile" ]
   then
   cat - >/tmp/sphfileRead <<End
      lines 0
      select * from sphfile where BaseFile='$BaseFile*'
      order by BaseFile,Sphere
      into iptfile/
End
   SQL /tmp/sphfileRead
   fi
```

and compiles and links without a problem. The tclMotif package uses an Imakefile and if your supporting files are in good shape, you should have no problem. If your supporting files are not in good shape, you must be having a lot of trouble installing contributed software and will be happier if you get that problem solved first. The tclMotif package produces an executable called *moat,* which is a stand-alone interpreter. The package includes a set of man pages and some example programs, including a "tour" of the Motif widgets.

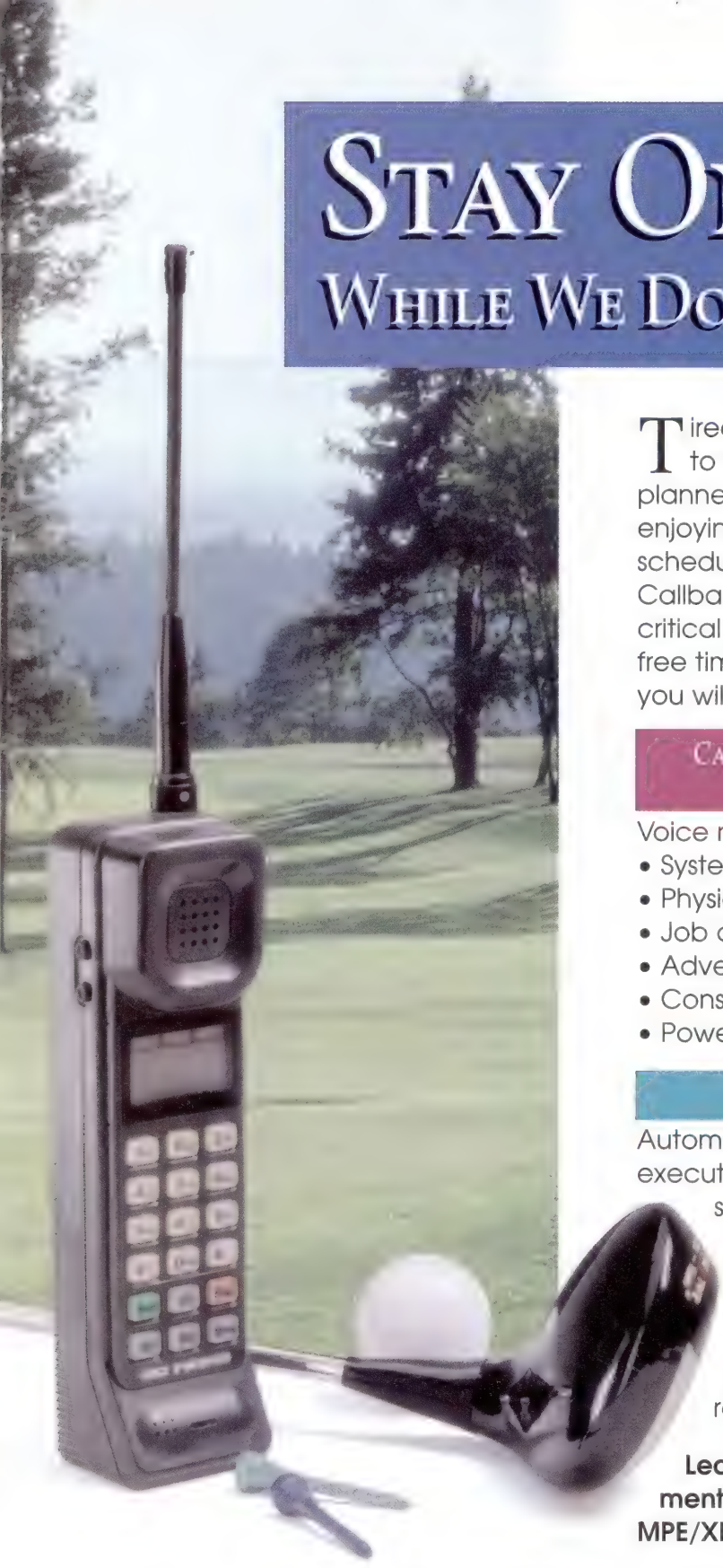
A Real Example

Breaking with tradition, I am not going to show you how to do a "hello, world" program. One of the reasons I looked at tclMotif was that I needed it. If I just wanted to write "hello, world," I had a lot of sample code!

The situation was this: I was working with the X spreadsheet product Tactician from Soft-tek International. One of the strengths of Tactician is that it has interfaces to all the popular UNIX databases and easy hooks to any of your own programs. I wanted to populate a spreadsheet with data from a Unify RDBMS database. There was no problem directly linking to a SQL script, but I needed more. I wanted to gather information from a subset of a table, and it was not convenient to have the search criteria in a cell of the spreadsheet. What I really wanted to do was ask the user for a name, write an SQL query on the fly, and execute it. This style of interface to Tactician works by placing the data in a pipe delimited file, which Unify SQL produces by default, named iptfile.

I decided I wanted the GUI implemented in a SelectionBox widget in DIALOG_PROMPT dialogue type. This turns off the list and apply button in the SelectionBox leaving just the prompt, the text widget, and the OK, Cancel, and Help buttons. I use this mode of the SelectionBox frequently. I decided not to write any help at this time, so I wanted to turn off the Help button.

My first attempt (*Listing 1*) was a Korn Shell script that called moat. I had the name input from the GUI written to



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CIRCLE 164 ON READER SERVICE CARD

LISTING 2

```
#!/usr/local/bin/moat
#    sphfileRead.tcl:    prompt for basefile name and run SQL

    xtAppInitialize

    xmSelectionBox .sb managed \
        -selectionLabelString "BaseFile Name" \
        -dialogType DIALOG_PROMPT

    .sb.Help    unmanageChild

    .sb    cancelCallback {
        exit 0
        }

    .sb    okCallback {
        if { "%value" != "" } {
            exec cat << {
                lines 0
                !rm -f iptfile
                select * from sphfile
                    where BaseFile='%value*'
                order by BaseFile,Sphere
                into iptfile/
                } > /tmp/sphfileRead
            exec SQL /tmp/sphfileRead
            exit 0
            }
        }

. realizeWidget
. mainLoop
```

stdout and captured it in the shell variable BaseFile. If the Cancel button was pressed or no name was entered, the BaseFile variable would be zero length and there wouldn't be much point in doing the SQL query. This all worked fine and also let me indulge my fondness for the heredoc construct.

You are not required to support TCL with the Korn Shell; it has enough tools of its own. As an exercise, I rewrote everything as a pure TCL script (*Listing 2*). It is a little bit easier to read and certainly the consequences of a button push are much more obvious.

Conclusions

The TCL/Motif combination is a great aid in making short and quick GUI programs. I would argue that this is the best use of TCL as a scripting language, since it doesn't have the support built in for really large projects. By support I mean the kind of object orientation we have come to demand in recent years. There are certainly contributed debuggers and GUI painters available. No one has arranged for a design or CASE tool to generate TCL, though this may be more a consequence of the contributed software culture than any comment on TCL. There is only one contributed (free) CASE tool that I have found, which generates C++ code, but that is a subject for another column. None of the commercial tools are integrated with TCL, to my knowledge.

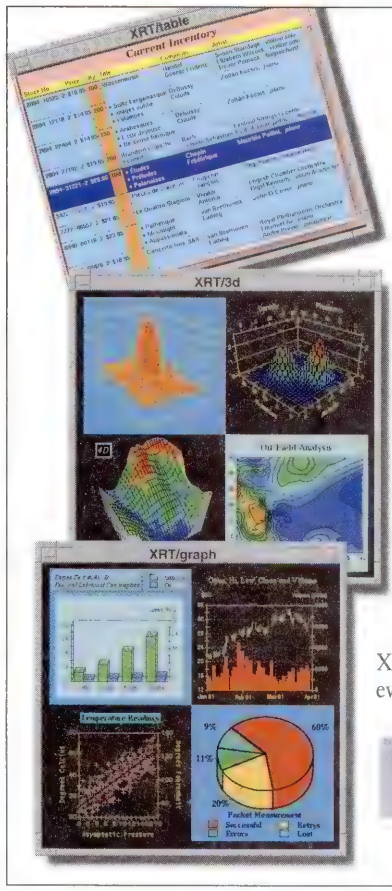
My restriction of TCL to small projects may be personal taste, since some very large projects have been built with TCL and it has some zealous partisans. One of the more interesting and informative debates I have seen recently on the Internet was on just this issue. It started with a request for a recommendation for languages that linked to X on comp.sys.x. It grew to a learned exchange of opinions between John Ousterhout himself, Niels Mayer (author of Winterp, the LISP front end to X and Motif) and other luminaries. The topic quickly became the strengths and weaknesses of several competing languages, notably TCL, LISP, Scheme, and WKSH. This was not the sort of discussion in which you expect conclusions, but all sides made telling points and criticisms.

There was a most interesting challenge to personal taste as a valid criterion. If software engineering is engineering, should there be some real metrics by which to judge languages? Some measurements of learnability, robustness of code produced with each language, ease of integration, etc. would be appropriate. Perhaps personal taste has no more place in the choice of implementation language than personal taste is involved in choice of materials for chip design? One conclusion that could be drawn is that these languages are useful for real work and that significant products use them every day.

Xcoral

The programmer's editor Xcoral mentioned in a previous column is no longer available at *ftp.x.org*. You can find it at its home site *ftp.inria.fr*. Author Lionel Fournigaultt informs me that it is at release 2.1 now and that he expects to release a new version by year's end. ◧

Larry Headlund is president of Eikonal Systems and has been working with commercial UNIX since 1982 and with X since 1988. Eikonal Systems distributes Xtty, a software product that allows Motif programs to be run on ASCII terminals such as VT220s. He can be reached at 617.482.3345 or lmh@world.std.com.



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CIRCLE 40 ON READER SERVICE CARD

HP-UX

by David L. Totsch

Staying In vi

HAVE YOU EVER BEEN editing away with vi and suddenly caught yourself needing to run a command on several lines of text? Then you find yourself either undertaking a long editing chore to do it by hand or exiting the editor to manipulate the text and re-entering the editor to incorporate the changes.

The folks at Berkeley did not enjoy exiting vi and getting back in any more than you do, so they provided a mechanism for calling programs from within a session. In its simplest form, you can call the shell to interpret a command with

```
:!<command>
```

Let's explore the ability to pass a portion of the file being edited to a command for processing and replacing those lines with the output of the command.

Let's say you are editing the following file (I have added line numbers for reference):

```
1       This is the top line, line 1
2       a - I Hope
3       d - good day
4       c - having a
5       b - you are
6
7       This is the last line, line 6
```

Within vi, the 'ex' call `:2,5!sort` yields this output:

```
1       This is the top line, line 1
2       a - I Hope
3       b - you are
4       c - having a
5       d - good day
6
7       This is the last line, line 6
```

vi sent lines 2 through 5 to *sort* and replaced the lines with the output.

If you want to insert output from a command pipeline, merely precede the "!" with the line number(s) you want to replace (here I have entered `:6!date`:

```
1       This is the top line, line 1
2       a - I Hope
3       b - you are
4       c - having a
5       d - good day
6       Mon Aug 15 14:58:22 EDT 1994
7       This is the last line, line 6
```

Shorthand for replacing the line your cursor is on with the output of a

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command is to enter "!!" You will see a "!" prompt appear in the lower left corner of the screen. Type the command you want to use and the output will replace the line the cursor is on. If the command yields more than one line of output, the additional lines will be inserted.

Just to get some additional mileage out of vi, let's say that I want to number lines consecutively from the line beginning with an "a" to the line beginning with a "d." To do this, enter

```
:/^a/,/^d/!pr -t -n1
```

The command `pr -t -n1` prints one-digit line numbers. `/^a/` matches the next line beginning with "a." Lines are matched until a line beginning with a "d" is encountered. Yes, we just selected a range of lines by specifying a pair of regular expressions.

One final example: you are editing a file and encounter a list of file names and you want to replace them with the long listing (lines 105-120). Simply enter

```
:105,120!xargs ls -l
```

and the lines will be replaced with the long listing output. vi `undo` will put everything back the way it was. Error output is also routed to your edit session, so you will know if a file does not exist.

Now you should be empowered to reduce the number of times you jump out of a vi session to manipulate the file with commands. I find the ability of vi to call commands with text from the file as input handy for what I have shown in the examples: sorting, inserting consecutive numbering, inserting output from commands, and verifying file existence. I am sure that with a little imagination, you can generate a longer list of situations where you find this capability of vi handy. ◧

David L. Totsch has worked in several different organizations over the past seven years as a system administrator with various flavors of UNIX. At present he is working with HP-UX systems and wide-area networks for a Fortune 100 company in the Piedmont area of North Carolina.

CSL/HP-UX

RECENTLY, I HAD THE opportunity to share with some non-technical managers here at Kodak my thoughts on UNIX. This group wanted to know about the history, capabilities, vendor strategies, and politics of our favorite operating system. In attempting to put a reasonable presentation together, I really had to dig back into some pretty dusty archives to come up with something. Oh, you hadn't heard? UNIX is 25 years old! Not quite as old as the HP 1000 or HP 3000 but definitely on track towards maturity.

One question often asked of me is, "If UNIX is that old, why wasn't it put out to pasture a long time ago?" I think its longevity can be attributed to several key events over the years, some that were planned, others that occurred purely by accident.

First let's review some of the history. Back in the sixties, AT&T was doing software development for their telephone equipment on a mainframe. This environment became increasingly ineffective because of the monolithic nature of the tools they had at hand. Some of the researchers at Bell Labs began to put together a new software development environment, including compilers, program development tools, and an underlying operating system. They also needed to use the hardware they had at hand, so Ken Thompson & Dennis Ritchie (the R in K & R 'C') began their work on a little-used PDP-7. This small machine (compared to the mainframes of the day), imposed some pretty stringent design limitations.

It was because of these design constraints that we can see more clearly some of the reasons why UNIX is "that way." Let me focus on one of the keys—the philosophy of tools. Brian Kernighan and P.J. Plauger give the following definition of a tool: "It uses the machine; it solves a general problem not a special case; and it's so easy to use that people will use it, not build their own" ([1]). This tool philosophy, along with the underlying foundations provided by the operating system such as pipes and standard in/standard out, have made the UNIX environment very flexible for the developer. There was so much flexibility, in fact, that whole applications would be developed by just plugging together the tools. This helped greatly in improving the productivity of the programmers as well as the OS developers themselves because they were not constantly reinventing functionality. If there is a downside though, it is knowing what tools exist and what they do well. With more than 300 commands and some pretty non-intuitive names like Grep, Awk, lint, and yacc, it can be pretty horrifying for the new UNIX user.

But let's be realistic, the things you do with a computer are pretty much the same, no matter what system you're on. Reading, writing, and processing data, sorting, merging, managing resources, communicating with applications—it's pretty much the same. The differences in the methods of interaction are generally syntactical and a matter of degree. It's like learning to program. Once you know how to design an algorithm, the programming is relatively easy. Let's not get too caught up with this "strangeness," but dig a little deeper and

discover what can be accomplished.

The second key success factor for UNIX has been its portability. When Kernighan and Ritchie developed C, and then wrote UNIX using it, they moved operating system development to a new level. No longer was it necessary to write an operating system in assembly language. When a manufacturer developed a new chip, all that was needed was to provide the C compiler for that architecture and voilà, a multi-tasking, functional operating system (UNIX) would be running quickly. This shortened the cycle times for both systems as well as applications. It also opened a lot of new possibilities to third-party vendors, because they now had a much large market for their products than in the days of proprietary OS dominance.

Portability is also the key reason for the success of software libraries. With so many UNIX developers, both commercial and academic, all working from a common set of interfaces (despite the vendor differences), it is almost inevitable that the selection of software will be immense. The Interex Contributed Software Library has been growing primarily by leveraging this large virtual development staff. Many of the contributions in the library were originally developed on non-HP platforms. But because of the nature of UNIX and C portability, we are able to enjoy the fruits of this labor, without significant modifications. Having this large base of software to draw upon doesn't mean that we are relying on the large community exclusively; we still need each and every Interex member to understand that their unique contributions are just as valuable to the users. And it doesn't have to be a large program to be useful. Just follow the UNIX philosophy, "Small is beautiful."

Have a happy holiday season; see you in 1995. ◧

(1) *Amateur Computerist*, Vol 6, no 1, winter/spring 1994

Paul Gerwitz is chairman of the CSL/HP-UX committee and is a technology specialist at Eastman Kodak Company in Rochester New York. He can be reached at 716.477.3067 or by e-mail at gerwitz@interex.org or gerwitz@kodak.com

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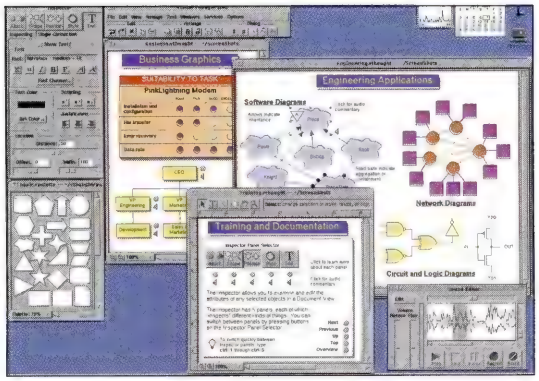
Product Focus

Visual Thought

Confluent, Inc. has announced a drawing tool for communicating ideas graphically. Aptly named Visual Thought, the tool combines ease of use and a broad application base so that users can devote their time to the *idea* they wish to convey, rather than to the *process* of graphically representing the idea.

Developed specifically to communicate information about relationships between things, one of Visual Thought's key features is the ease of creating objects. Another is its ability to provide "intelligent connections" between these objects, or connections that are maintained even when objects are moved around on the screen.



William Tseng, President of Confluent, Inc., noted that it is a "simple concept" that is useful in a wide range of applications. "It's got something for the business, engineering, and technical graphics user."

The difference between Visual Thought and other drawing tools, such as CorelDraw, is that "Those tools are not diagramming tools," Tseng said. For example, consider how one would draw a diagram using Booch methodology in each application. In Visual Thought, a user would simply select the appropriate Booch symbol from a provided palette. In other drawing tools, the user would face the task of drawing the appropriate object—in Booch methodology, a cloud.

Another difference between Visual Thought and drawing tools, Tseng explained, is that connections between objects snap to the perimeter of objects, regardless of how complex the object is. This eliminates the guesswork involved in matching up connecting lines between objects in other drawing tools.

And what if one wanted to move the Booch objects around on the page? In Visual Thought, the connections remain intact, regardless of where connected objects are dragged and dropped. With some free-hand drawing tools, the connection between moved objects must be redrawn.

This feature set is ideal for Confluent's target market—the technical, engineering, and business graphics market. "We've got a large group of technical people using workstations. They're not graphics designers," said Tseng. "How many times is an engineer going to produce an illustration?" As another option, hardware engineers can use a schematic editor, "but what happens if you want to create a simple diagram? It's not that easy. And you don't want to fire up a schematic editor to do that," Tseng added.

With Visual Thought, users simply select from the appropriate palette symbols, shapes, and other objects specific to schematics. For engineers, Visual Thought offers drag-and-drop palettes that correspond to Booch notation, Rimbaugh notation, data flow and process diagrams, and circuit and logic diagrams.

Because of the easy-to-use drawing palettes and smart connections between objects, the tool is also appropriate for business users, who require ease of use and learning in a tool. Tseng, a software engineer, observed, "Engineers will put up with anything"

in a tool; conversely, "business users don't put up with much."

Ease of use is enhanced through "true WYSIWYG (What You See Is What You Get)" between the screen and printed output. This feature extends to live updating of the output so that the user can see exactly where a dragged object is being moved and how the connection between the moved object and other objects changes. The dynamic updating capability also enables users to change values of an object—measurements, for example—in real time by dragging a slider. "Very, very few programs in UNIX have (this ability) at this time," Tseng stated.

Other ease-of-use features include keyboard shortcuts and hot buttons for frequently used commands, as well as 100 levels of undoing and redoing of actions. Viewing options include zooming from 10 percent to 1,600 percent of the drawing's actual size, panning with scroll bars, and grids, rulers, and multiple viewing windows. To further reduce the learning curve, a suite of sample applications is provided to help users generate their own document ideas.

Although not a dedicated presentation graphics tool, Visual Thought offers many drawing facilities for this purpose. Text can be added to shapes or connections choosing various fonts, sizes, styles, and colors; strokes, fills, and shadows can be represented in any color, limited only by the user's system; and free-form, editable, and drag-and-drop palettes can be customized or created from scratch. These features can be used to create organizational charts, graphs, and network diagrams, Tseng suggested.

The range of applications for Visual Thought is expanded even further with the tool's "attachment" feature, which provides the ability to import images, record sounds, and link arbitrary (including executable) files to objects. The tool's "attachment" mechanism allows the user to click on buttons associated with individual objects to run arbitrary applications, including shell scripts, spreadsheets, simulators, or hierarchical drawings created from Visual Thought. Users can create technical figures or illustrations with callouts and export then as Encapsulated PostScript for inclusion in document processors such as Frame Maker.

Among uses for the attachment feature, Tseng suggested online multimedia training tools, electronic story boards, and online organizational charts with photos and sound clips of each employee.

A unique editing capability is the Inspector, which saves screen space while leaving important editing functions "exactly one click away," said Tseng. Dialogue boxes for editing the attached file, shape, position, style, and text attributes can be called into the Inspector by selecting the corresponding attribute button from the ribbon at the top of the Inspector box. When the user clicks on the "text" button, the Inspector box displays a dialogue box for editing text attributes that include font, style, point size, text color, justification, etc.

Other editing features include "smart" pasting, which aligns sets of objects in a regular pattern for efficient construction of arrays; the ability to align or spread objects in the horizontal or vertical directions simultaneously; and facilities to size objects according to specific criteria.

To run Visual Thought, systems require 16 MB of RAM, 32 MB of free swap space, and a color or grayscale monitor. A microphone is recommended for recording and editing sounds.

Visual Thought is available on Sun SPARCstations. Versions that support HP PA-RISC workstations running HP-UX are scheduled to be released by the end of 1994. The tool is priced at $995 for a floating license and $595 for a node-locked license.

Contact Confluent, Inc., 132 Encline Court, San Francisco California 94127-1838, phone: (415) 586-8700, fax: (415) 586-8838, e-mail: vthought@confluent.com. ◧

Michelle Pollace is the New Products editor for hp-ux/usr.

New Products

Client-Server Program

Cognos Incorporated has announced the availability of "Client-Server Ready," a product and service offering designed to help organizations move from midrange platforms to client-server computing efficiently and effectively.

The components of the Cognos Client-Server Ready program include customized two-day training that offers a choice of courses; the latest versions of PowerHouse and PowerHouse Client for Windows; PowerPlay and Impromptu, Cognos' Windows-based end-user tools for accessing, analyzing, and reporting corporate data in the client-server environment; and the Axiant Developer's Workbench, a graphical PC-based development environment designed for building complex, scalable, enterprise client-server applications.

Client-Server Ready is offered with user-based pricing.

Contact Cognos, 67 South Bedford Street, Burlington, Massachusetts, 01803, phone: (617) 229-6600.

Version Control

Diamond Optimum Systems has announced Release 2.5 of Version Control System-UX. VCS-UX operates in a true client-server environment, recording all changes made to application software, who made them, and why. VCS-UX provides in-depth access control and automatically notifies users who need to know when a specific action has been performed. VCS-UX automatically maintains a comprehensive documentation repository.

Release 2.5 fully supports either stand-alone or combined configurations of the HP-UX, MPE, IBM AIX, and Microsoft Windows platforms. The new release provides a common interface and single point of control for all of the users' software configuration and distribution management tasks. VCS-UX electronically distributes software to the networked servers and desktop computers and maintains a complete software inventory.

Contact Diamond Optimum Systems, Inc., 22801 Ventura Blvd., Suite 105, Woodland Hills, California 91364, phone: (818) 224-2010, fax: (818) 224-2009.

Backbone Network Engine

API International has announced FASTCopy, a backbone network engine that speeds software transfer up to 10 times over networks and guarantees software delivery for distributed client-server operations. The backbone software, a product of SoftLink, Ltd., works in heterogeneous multivendor environments over TCP/IP networks. While working over WAN links, FASTCopy outruns UNIX transfer programs such as ftp and rcp by a factor of 3 to 10 times.

Unlike FTP, FASTCopy can use wildcard parameters. Sites can quickly distribute software across systems and wide area networks. The software also provides for file transfer and works inside batch-oriented distribution applications. It can work as a high-speed delivery mechanism for software distribution and remote backups and provide reliable and flexible distribution in image transfer, database updating, and data collection. The software also automates routine maintenance and management operations.

An operations guarantee mechanism protects off-site users from system crashes. FASTCopy recovers from the exact point of failure to protect data integrity and provides several levels of checks to guarantee that a target file is an exact duplicate of a course file.

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Contact API International, P.O. Box 91027, Austin, Texas 78709, phone: (512) 280-4391, fax: (512) 280-0309.

IISI and Informix Partnership

Innovative Information Systems, Inc. (IISI) has signed on as a value-added partner to software developer Informix Software Inc. It will provide integration and solutions expertise to Informix customers and will act as a value-added reseller (VAR) of Informix Software products.

The agreement provides IISI with licenses to Informix's wide range of software products and VAR status, with the ability to provide customers with technical support and training. IISI will receive additional support for all software from Informix.

Informix's software for UNIX OLTP database servers is capable of handling high-volume activity and can archive large databases online and in a timely manner. IISI/CDI Computer Services is a full-service systems integrator specializing in emerging technologies, including midrange computing solutions, UNIX, open systems, client-server, and mainframe alternatives.

Contact IISI, 320 Norwood Park South, Norwood, Massachusetts 02062, phone: (617) 769-7511, fax: (617) 762-5164.

Backup Software

Innovus Technologies Inc. has introduced NetWorker for HP 9000 Version 4.0. The network backup software now provides media pools to allow backup data to be segregated to distinct media by backup group, backup client, backup level, or backup device. Multiple concurrent jukebox support now allows simultaneous backup streams to be sent to multiple autoloading devices. Enhanced device support now includes all backup storage devices of significance to the HP server market. An enhanced jukebox interface allows streamlined support for new autoloaders as these devices become available.

Support for Oracle's Parallel Backup/Restore Utility (Obackup), an intelligent interface for the complete protection of Oracle7 databases, is also provided. The software, known simply as the Oracle Database Module, is an add-on module for Innovus' NetWorker for HP 9000.

NetWorker for HP 9000 is said to be the only enterprise-wide backup/restore solution for HP-UX capable of meeting the requirements of the multivendor open systems network. Client support is offered for more than 20 backup client types. Server support is offered for HP 9000 Series 700s and Series 800s. Supported storage devices include M-O, DDS-2, 8-mm, DLT 3480/90, QIC, and 9-track.

NetWorker for HP 9000 Version 4.0 is available. Pricing begins at $2,000 for a 10-client license.

Contact Innovus Technologies, 200 James Street South, Suite 204, Hamilton, Ontario, Canada L8P 3A9, phone: (905) 529-8117, fax: (905) 572-9586.

Enterprise Resource Planning

Fourth Shift Corporation has announced Release 3.0 of its JIT Enterprise System, the company's UNIX/Oracle-based Enterprise Resource Planning system. Release 3.0 contains new features and enhancements to many of JIT's approximately 60 application modules. Release 3.0 also offers support for Oracle 7 and

Communications Servers

Aurora Technologies has announced a series of high-performance, four- and eight-port asynchronous and synchronous ISA serial terminal and communications servers for HP 9000 Series 700 workstations. The boards incorporate Aurora's serial communications technology, developed over years in the SBus market. Combining on-board RISC processing, dedicated data buffers, and flow control processing, the Aurora boards offload both CPU workload and network traffic for optimum system performance.

The low-cost 401A and 801A are designed for standard local area terminal and peripheral connectivity; the 401AX and the 801AX add extended dual-ported RAM buffers for data security and high-performance communications; and the versatile 401A+ and 801A+ provide high-speed WAN routing and bridging with the reliability and security of synchronous data communications.

The A and AX models support speeds to 115.2 Kbps and the A+ models support speeds up to 128 Kbps, all full-duplex. The 401A+ and 801A+ are designed to operate with several synchronous communications protocols. These include SNA for IBM system connectivity, X.25 and Frame Relay for dedicated wide-area communications, and point-to-point protocol for low-cost links over standard phone lines. A synchronous developer's kit allows custom and off-the-shelf synchronous networking applications to use the Aurora hardware for remote LAN sharing.

The boards are available now for prices ranging from $495 to $1,095.

Contact Aurora Technologies, Inc., 176 Second Avenue, Waltham, Massachusetts 02154, phone: (617) 290-4800, fax: (617) 290-4844; e-mail: sales@auratek.com.

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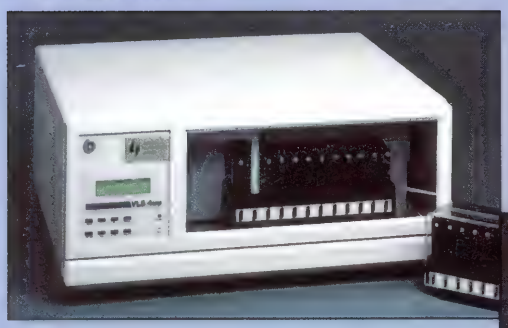

Tape Library Autochangers
- HP 4mm DAT, Exabyte 8mm, 3480, QIC, DLT, S-VHS, and AMPEX DST 19mm drives
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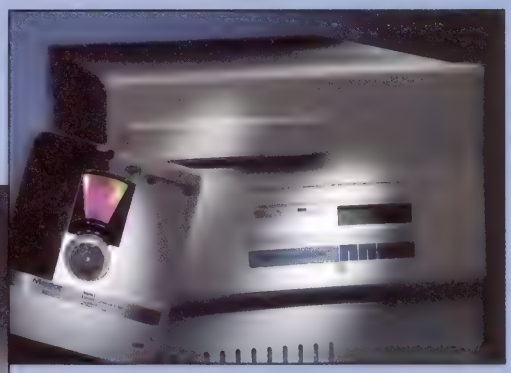

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New CA-Unicenter Pricing

Computer Associates has slashed prices of CA-Unicenter to target entry-level client-server users and large heterogeneous enterprises.

The new pricing is intended to eliminate cost hurdles stopping small and medium-sized organizations from automating their systems with the controls users say they need. It also allows users to take advantage of deep volume discounts by grouping computers regardless of manufacturer.

Pricing of CA-Unicenter for an HP 9000 Model G40 has been reduced from $60,200 to $14,400 under the new pricing structure.

Contact Computer Associates, One Computer Associates Plaza, Islandia, New York 11788-7000, phone: (516) DIAL CAI (342-5224), fax: (516) DIAL FAX (342-5329).

greatly enhanced capabilities for managing international operations.

Highlights of Release 3.0 include material and labor backflushing by pay-point operation, inspection/MRB processing for all orders, comprehensive variance analyses, multiple currencies and sales tax/VAT for sales and purchase order processing, and product line accounting.

The new release also exploits Oracle 7 features such as shared structures, cost-based optimization, and the new precompilers.

Contact Fourth Shift Corporation, 7900 International Drive, Minneapolis, Minnesota 55425 phone: (612) 851-1900, fax: (612) 851-1560.

Tape Subsystems

Bering Technology, Inc. has announced the Echo Double 8482HS tape subsystems, said to deliver up to 32 GB of tape backup by incorporating two high-speed data compression HP DDS-2 tape drives in a single system. The Echo series supports HP 3000, 9000, and 1000 computer systems with HP-IB or SCSI interface.

The 8482HS model is equipped with Bering's "SC" feature, which integrates both HP-IB and SCSI interfaces in a single system. With the SC feature, users can connect the appropriate cable to the back panel and select the desired interface through the front LCD control panel. The 4482SC with HP-IB can emulate HP7970, 7974, HP7980, and HP DDS tape protocols. In SCSI mode, the drives support HP-UX and MPE/iX's backup features.

The Echo 8482HS uses built-in hardware data compression to achieve higher capacity and faster performance. With 4:1 maximum data compression, the dual DDS-2 tape subsystem can reach up to 32 GB capacity and a sustained transfer rate of 1 MB/second. With a 2:1 average data compression ratio, up to 16 GB capacity can be reached. The Echo models also support HP's Fastsearch utility for quick file retrieval.

Contact Bering Technology, Inc., 1357 Dell Avenue, Campbell, California 95008, phone: (408) 379-6900 or (800) 237-4641, fax: (408) 374-8309.

EDI Mapping

EDI Solutions has announced EDImap for Windows, an easy-to-use Electronic Data Interchange (EDI) mapping tool. This new version of EDImap has all of the features and flexibility of previous versions.

EDImap for Windows provides all the functionality and processing efficiency required for the most sophisticated EDI applications, the company notes. It guides users through the mapping process with online help and windows that show both the EDI transaction and the user's application. EDImap has put all of the components users need to map onto one screen.

It also offers conditional processing, code conversion, subelement processing, and hierarchical loops for complex mapping. The product is designed to extend beyond the realm of programmers; technical and nontechnical staff alike can use all of EDImap's features, the company notes.

EDImap for Windows is available with any of EDI Solutions' translation systems for the HP 3000, HP 9000, IBM, DEC, and PC environments.

Contact EDI Solutions, 2051 Killebrew Drive, Suite 220, Bloomington, Minnesota 55425, phone: (612) 858-1100, fax: (612) 858-1150.

EISA Expansion Box

MDL Corporation has announced the EX 700, an easily installed expansion box designed to enhance the expandability and capabilities of EISA on the HP Apollo 9000 Series 700 workstations.

The EX 700 is designed to provide the widest range of storage capacity available through the additional three EISA slots. The I/O cards that can be added to an HP/Apollo 9000 workstation include SCSI FDDI controllers, Ethernet controllers, video, X.25, SNA, bus conversion, and third-party hardware products.

The EX 700 can be installed by users and is virtually maintenance free, the company notes. The company offers a one-year warranty with exchange on the

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EX 700. The EX 700 is completely compatible with all single EISA slot HP/Apollo 9000 Series 700 workstations.

Contact MDL, 15301 NE 90th Street, Redmond, Washington 98052, phone: (206) 861-6700, fax: (206) 861-6767.

New from IEM

DAT Autofeeder

IEM is offering HP's 6-tape DDS-2 DAT autofeeder. With data compression on (2:1 ratio), each tape can hold up to 8 GB for a total capacity of up to 48 GB—all in a shoebox-sized box. With compression on, the effective transfer rate becomes 1 MB/second.

Alexandria 2.5

IEM, Inc. has announced backup capabilities for Oracle and Informix databases with Alexandria Version 2.5. Alexandria's database "personalities" interface directly with vendors' database backup utilities, allowing database administrators to use Alexandria for online backups of their databases and to integrate database backups with UNIX filesystem backups.

Alexandria software now supports 3480 tape, DAT libraries with internal DDS-2 tape drives, stand-alone tape drives, 4-mm (DDS-1) and 8-mm tape libraries, and rewritable optical disk juke-boxes. Version 2.5 includes improved mail capabilities and added command-line and interface options. Alexandria also features an X-11/Motif interface.

Four-mm Backup

IEM Inc. has announced a new line of 4-mm DDS-2 DAT 20-, 40-, and 60-tape carousel autochangers. The simplest configuration available is a 20-tape carousel with a single DDS-2 DAT drive. This can be upgraded to include 40 or 60 cartridges, a bar code reader, or more drives (up to 4).

The built-in data compression capabilities increase the effective tape capacities and transfer rates. At a typical 2:1 compression ratio, the effective tape capacity is 8 GB, and the effective transfer rate becomes 1 MB/second.

Contact IEM, Inc., 1629 Blue Spruce Drive, Fort Collins, Colorado 80524, phone: (303) 221-3005, fax: (303) 221-1909; in Europe, at (44) 0608 645000, fax: (44) 0608 645155.

Data Warehousing

Information Builders has announced enhancements to FOCUS to broaden the 4GL's performance and functionality while expanding its rightsizing and data warehousing capabilities. FOCUS 6.8 on HP-UX is compatible with mainframe FOCUS and provides mainframe application portability to HP-UX platforms. Mainframe 3270 terminals (through Haltek's terminal emulator) now can be used to run FOCUS applications that reside on the HP 9000.

For data warehousing, FOCUS 6.8 features optimized sort and retrieval and symmetric multiprocessor enhancements. The FOCUS database now offers 1 GB of individual table support (total 64 GB), long fieldname support for relational databases, reporting enhancements, and upgraded security features for database administrators. FOCUS and EDA/SQL also provide a direct interface to Red Brick Data Warehouse.

EDA/SQL 3.0 features optimized retrieval for all third-party RDBMSs, new pricing and packaging based on customer requirements, and new facilities to enable database replication and cleansing of data.

Contact Information Builders, 1250

Manufacturing

Datalogix International Inc. has announced CIMPRO 5.0. Among the key new features are an integrated 4GL environment for reducing the cost and difficulty of application maintenance, as well as a report writer that allows users with no programming background to create their own reports. A global dictionary now serves to ensure application consistency.

The optional graphical user interface supports both character-based and windows-based graphical workstations concurrently on a single host application. The product also is easy to install and implement.

The new Cost Development module allows users to construct "what if" scenarios to determine product cost with resource association and percentage costs of additional resources. The Sales Decision module allows a user to compare current sales activity with prior yearly performance. A completely revised Regulatory Management module complies with U.S. and European directives. In addition, the product has been internationalized to provide for multi-currency, multi-bank, tax support, and international dates.

CIMPRO supports all popular hardware platforms, including the HP 9000, and also supports DOS-based Novell networks. CIMPRO 5.0 pricing depends on platform and configuration.

Contact Datalogix, 100 Summit Lake Drive Valhalla, New York 10595, phone: (914) 747-2900, fax: (914) 747-2987.

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New from Portable Graphics

Surface Modeling

Portable Graphics, Inc. has announced that Imageware, Inc. is now shipping accelerated versions of its Surfacer Version 3.1 three-dimensional surface modeling software for HP and Sun workstations. Imageware uses the NPGL library from Portable Graphics to port the X Windows/Motif version of Surfacer to the HP platform, where it runs at accelerated speeds.

Surfacer provides tools for point processing, NURBS curve and surface generation, geometry analysis, and geometry input/output. Users can take advantage of advanced 3-D digitizing technologies, such as laser or optical scanners.

Graphics Application Development

Portable Graphics and XOX Corporation have announced that they will jointly develop and market an object-oriented application development toolkit to simplify and accelerate development of interactive 3-D graphics visualization applications with geometry problem-solving capabilities.

The toolkit, named EDISON, merges the sophisticated user interface and graphics rendering provided by Portable Open Inventor from Portable Graphics with the complex geometric modeling capability of the SHAPES Geometric Computing System from XOX Corporation in an industry-standard, object-oriented C++ programming environment.

EDISON is targeted at developers of 3-D graphics software for geophysical simulation and analysis, scientific visualization and analysis, biomedical imaging and analysis, CAD/CAM, computer-aided industrial design, rapid prototyping, finite element analysis, computational fluid dynamics, concurrent engineering, and animation.

Both companies will sell and support the EDISON toolkit. OpenGL is required for Edison, so Portable Graphics will offer Portable OpenGL licenses along with EDISON. EDISON will first be released for Silicon Graphics workstations in the first quarter of 1995 and is planned for workstations by HP and others sometime in 1995.

Contact Portable Graphics, Inc., One Technology Center, 2201 Donley Drive, Suite 365, Austin, Texas 78758-4538, phone: (512) 719-8000; or XOX Corporation, Two Appletree Square, Suite 334, Minneapolis, Minnesota 55425, phone: (612) 854-3087.

GPIB Instrument Control

GPIB Instrument Control

National Instruments has announced a high-performance IEEE 488.2 interface kit for HP 9000 Series 700 workstations with EISA slots. The GPIB-HP700-EISA kit features data transfer rates for both read and write operations of at least 5.5 MB/second using the HS488 protocol and 1.3 MB/second using standard three-wire GPIB transfers. High-performance IEEE 488.2 Controllers are used to monitor, control, and communicate with thousands of GPIB-based engineering, scientific, or medical instruments and graphics equipment.

The GPIB-HP700-EISA kit includes the EISA-GPIB board. It also includes N-488.2M software for HP-UX Version 9, which features more than 50 GPIB-related routines and functions. Applications written using NI-488 functions and NI-488.2 routines are portable from many other computer platforms and operating systems. The driver software can be accessed from standard programming languages such as C and is compatible across a wide variety of platforms. Users can port existing NI-488.2 programs from other computing platforms to Series 700 workstations.

The GPIB-HP700-EISA kit was expected to be available in late July for $995.

Contact National Instruments, 6504 Bridge Point Parkway, Austin, Texas 78730-5039, phone: (512) 794-0100 or (800) 433-3488, fax: (512) 794-8411.

Client-Server RDBMS Tool

Bluestone has announced the latest version of db-UIM/X, a client-server application development tool for relational databases. Key new features include support for Oracle7 and Dynamic SQL (DSQL) capabilities for both Sybase and Oracle. The tool stores and keeps track of these DSQL Procedures within the normal UNIX file system structure during development. db-UIM/X2.6 handles both Stored Procedures and native SQL on the client application. It supports native toolkits.

Other new capabilities include the ability to integrate C++ classes, improved methods support, new widgets, and imbedded support for X/Open message catalogues, which will enable international

customers and distributors to localize db-UIM/X for their native languages.

In addition to Oracle7, Version 2.6 supports Sybase V4.9 and Sybase System 10 on Sun, HP, and IBM platforms. Quantity-one pricing for the tool is $6,500. Upgrades from UIM/X to db-UIM/X2.6 cost $2,250 per unit.

Contact Bluestone, 1000 Briggs Road, Mount Laurel, New Jersey 08054, phone: (609) 727-4600, fax: (609) 778-8125, e-mail: blustone!info@vunet.vu.net.

System/36 Migration

Emphasys Software has announced the Easy-In Program for RPG software developers only, new in 1994. The program was designed for System/36 RPG software developers who are interested in breaking into the open systems software market. For a $1,500 investment, the RPG software developer receives a Cross/36 Development System to migrate its application to an IBM/RS/6000, Intel-based PC, HP 9000, or NCR 3000 platform and 90 days free technical support. An annual support contract is $750 per year. Cross/36 runtime fees are 10 percent of the migrated software's list price.

Developers can migrate their applications once and sell the new package to both current customers who want to move off the System/36 and to new customers already on the target platform.

Contact Emphasys Software, 9855 W. 78th Street, Suite 240, Eden Prairie, Minnesota 55344, phone: (612) 941-9337 or (800) 800-3399, fax: (612) 941-9750.

Automatic Runtime Debugger

ParaSoft Corporation has announced Insight++ 2.0, which includes new support for C++ programs and improvements to existing features.

Continued

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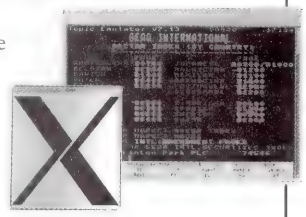

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Legacy System Maintenance

The PROGENI Corporation (TPC) has released Micro GLE Version 6.2, a complete, integrated 4GL toolset for the maintenance of existing legacy systems and rapid new development of multi-platform software from a single source. Applications can be run on Unisys and IBM mainframes, HP, Data General, and UNIX minis, and DOS or OS/2 PCs.

The product offers a 400-percent increase in speed of the engine and generator, improved default directory structures for client-server/LAN installations, and a new Microsoft Windows interface.

The enhancements reduce key entry/syntax errors by pasting direct from the data dictionary to the editor, report writer, or screen painter. High-speed importing of data, program extraction, and data dictionary loading tools are included. The product also supports object-oriented screen handling independent of file manipulation, reporting, and business logic mainline routines.

The product is integrated with MicroFocus COBOL Version 3.1.41 and Multi-Edit Version 7.

Contact PROGENI Corporation, 3150 Holcomb Bridge Road, NW, Suite 220, Norcross, Georgia 30071, phone: (404) 840-7550, fax: (404) 840-7907.

Insight++ is designed to pinpoint bugs quickly and provide all the information necessary to repair the bug immediately. It detects memory corruption, operations on uninitialized, NULL and "wild" pointers, memory leaks, errors allocating and freeing dynamic memory, and operations on pointers to unrelated data blocks.

Insight++ is said to be the only runtime debugger on the market that can identify bugs specific to C++. It also finds problems with overloading operators, C++ dead code, and errors in calling class functions.

Insight++ also includes Invision, an algorithm validation tool that produces visual images of memory and data patterns; InUse, a graphical "Malloc Monitor" that graphically shows how a program allocates and frees memory as it runs; and TCA (Total Coverage Analysis), which provides information about which pieces of code have been tested, how much code was tested, and how many times different code blocks were executed.

Insight++ is available for the HP 9000 and other systems. It works with most popular C++ compilers. Pricing begins at $1,495 for a three-user license. ParaSoft offers an unconditional 30-day money-back guarantee.

Contact ParaSoft Corporation, 2500 E. Foothill Blvd. #205, Pasadena, California 91107-3464, phone: (818) 792-9941, fax: (818) 792-0819, e-mail: ahicken@parasoft.com, ftp: ftp.parasoft.com, www: http://www.parasoft.com.

Customer Service Management

Clarify Inc. has announced its next-generation Customer Service Management (CSM) system, Clarify Version 3.0. Clarify 3.0 provides advanced help desk management, defect tracking, and field service management. The Clarify Customer Service Management (CSM) system consists of ClearSupport, the technical support management system; ClearQuality, the defect tracking system; ClearLogistics, the field service inventory management system; and ClearExtensions, the customization and integration product line. Clarify integrated full text search (FTS) technology with the Diagnosis Engine to search existing documentation, technical notes, product specifications, and CD-ROM databases for routine question and answer situations.

Pricing per concurrent user averages $5,000 for ClearSupport, $3,000 for ClearQuality, and $1,000 for ClearLogistics (Field Operations Module).

Contact Clarify Inc., 2702 Orchard Parkway, San Jose, California 95134, phone: (408) 428-2000, fax: (408) 428-0633.

Data Replication

Quintus Corporation has announced InsyncQ, designed to allow users of CustomerQ, Quintus' enterprise-wide help desk system, and other client-server help desk applications to share information and problem/solution data across sites and between organizations. Users can share data across a wide range of SQL and ODBC-compliant databases, including Informix, Ingres, Oracle, and Sybase.

InsynQ provides CustomerQ users with simultaneous access to the same data, so staff members can collaborate on a problem. The software allows managers to selectively duplicate data and provide complete, automated fault tolerance and disaster recovery. Management can specify a complete backup of the database to a remote site or differential backups.

InsyncQ is priced at $2,000 and operates on HP 9000 servers and others. It supports character-based, Microsoft Windows, and Motif user interfaces and Informix, Ingres, Oracle, Sybase, and ODBC-compliant databases.

Contact Quintus Corporation, 301 East Evelyn Avenue, Mountain View, 94041, phone: (415) 254-2800 or (800) 542-1283, fax: (415) 428-0211.

Continued

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If you compare the Sola 700 to other "on-line" units, you'll discover that it's the only one to feature a full isolation transformer that prevents electrical noise from entering your system. What's more, it features advanced diagnostics and RS232 communications, is SNMP ready, has a smaller footprint, and is lighter in weight. So when you consider all factors, Sola 700 should be your choice for power protection.

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Redundant scsiTerminal Server

Redundant scsiTerminal Server

Central Data Corporation has introduced the Redundant scsiTeminal Server, said to be the first product of its kind targeted at the UNIX high-availability system market. The Redundant scsiTerminal Server (ST-8008) provides eight fully-redundant serial ports for connecting modems, printers, terminals, or other RS-232 devices. It connects to the UNIX host via the SCSI bus, without consuming any system card slots. The ST-8008 is compatible with all the leading UNIX workstations and servers, including HP.

Separate power supplies, SCSI buses, processors, and RS-232 circuitry provide redundancy in case of component or host system failure. The ST-8008 can connect to two separate UNIX hosts and provides a power fail switch-over mode in case one of its scsiTerminal Servers loses power.

The price for the ST-8008 is $2,995.

Contact Central Data, 1602 Newton Drive, Champaign, Illinois 61821-1098, phone: (217) 359-8010, fax: (217) 359-6904.

Xbase Programming

WorkGroup Solutions (WGS) has announced FlagShip 4.3, which enables UNIX programmers to develop applications under the Xbase programming environment.

FlagShip is an Xbase language and database that takes full advantage of UNIX to provide full Xbase compatibility, an object-oriented programming language, a flexible preprocessor, executable code, and seamless integration with other languages and databases. It supports the C extend system of Clipper and inline C code, provides for production of ANSI C intermediate code, and requires no royalty or runtime fees.

According to the company, a hundred-line application in FlagShip can represent thousands of lines of C code. The code is then translated to C and compiled.

WorkGroup Solutions offers FlagShip in four user licenses: as an evaluation unit, single user, four-user, and an unlimited number of users. Licenses for HP-UX systems range from $990 to $5,700. The evaluation unit is a fully functioning version of FlagShip and comes with documentation and a 30-day runtime limit.

Contact WorkGroup Solutions, P.O. Box 460190, Aurora, Colorado 80046-0190, phone: (303) 699-7470, fax: (303) 699-2793, e-mail: wgs@gcs.com; CompuServe 71324,3134.

Structural Engineering

Structural Research & Analysis Corporation has announced COSMOS/M ENGINEER 1.71, featuring advanced dynamics and nonlinear analysis, direct geometry transfer between Pro/ENGINEER and COSMOS/M ENGINEER, COSMOS/M FFE (Fast Finite Element) solution technology (currently limited to thermal analysis), a new design optimization system powered by FFE, and a new flowchart-based help system with menu masking.

COSMOS/M FFE analyzes complex designs up to 100 times faster than traditional FEA programs and requires far less disk storage space, the company notes. As additional FFE modules become available, they will be incorporated into later releases of COSMOS/M ENGINEER. The new optimization module helps users minimize objective function while satisfying such design constraints as stress, temperature, frequency, and buckling load. The new design optimization module was integrated with Pro/ENGINEER.

COSMOS/M ENGINEER 1.71 features greater ease of use. The new help system shows users where they are in their analysis and what to do next. Menu masking assists users by deactivating menu picks that would be incorrect for the current stage of the analysis process.

COSMOS/M ENGINEER 1.71 costs $8,500 for the full system. COSMOS/M ENGINEER runs on the HP 9000 Series 700 and other platforms.

Contact Structural Research & Analysis Corporation, 2951 28th Street, Suite 1000, Santa Monica, California 90405, phone: (310) 452-2158, fax: (310) 399-6421.

Informix Database Backup Module

The Spectra Logic division of Western Automation has announced an addition to Spectra Logic's Alexandria Backup Librarian software for the backup and restoration of live Informix databases and integration of database backups with UNIX filesystem backups.

Alexandria supports a variety of UNIX workstations and fileservers and

accommodates a variety of automated media handling systems. Alexandria can back up to tape libraries from Spectra Logic, Exabyte, and ADIC, as well as HP Optical Jukeboxes.

Alexandria manages and automates network backup, from automatically starting scheduled store operations to managing data, media, storage devices, and even device maintenance across the entire network. Database backup personalities allow Alexandria to seamlessly integrate database backups with UNIX filesystem backups.

The Informix Backup Personality for Alexandria is priced at $6,000 to $9,000, depending on host system size.

Contact Spectra Logic, 1700 North 55th Street, Boulder, Colorado 80301, phone: (303) 449-7759, fax: (303) 939-8844, e-mail: alexandria@spectra.wali.com.

root Account Control

Freedman Sharp and Associates Inc. has announced PowerBroker, which gives system administrators full control over who can run what, when, and where in the root account, without knowing root's password. It also creates an indelible log of programs running as root.

Administrators can assign specific system management duties to other users. The full working environment of each program can be specified to address the many security issues surrounding root activities. Root activity is logged selectively, recorded in entire sessions, or monitored in real time. Network traffic can be encrypted.

PowerBroker is available immediately for HP 9000s and other UNIX platforms.

Contact Freedman Sharp, phone: (403) 264-4822, fax: (403) 264-0873; e-mail: info@fsa.ca.

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Improved Graph Widget

KL Group Inc. has announced the release of XRT/graph Version 2.4, an X/Motif two-dimensional graphing widget. XRT/graph 2.4 now features zooming, rotating, and scaling capabilities built directly into the widget; new axis controls such as origin placement, numbering methods, labeling, and direction; missing values (holes) in XRT/graph datasets; improved shading of 3-D bar and pie charts (and other aesthetic improvements); a full C++ API; and IL support.

XRT/graph uses the same object-oriented API as the Motif toolkit. Version 2.4 includes a graphical prototyping and code development tool called "Builder," which allows users to define interactively and view immediately all types of graphs. Builder also outputs C code and resource files that may be used in an application.

XRT/graph Version 2.4 is available on HP 9000s and other platforms. A single development license costs $7,995 and a network license costs $1,995. There are no runtime or distribution fees.

Contact KL Group Inc., 260 King Street East, Third Floor, Toronto, Ontario, Canada M5A 1K3, phone: (416) 594-1026 or (800) 663-4723, fax: (416) 594-1919; e-mail: info@klg.com.

Manufacturing Software

Andersen Consulting has announced MAC-PAC OPEN Version 9.0, an integrated manufacturing, distribution, and financial software solution for mixed-mode manufacturers. The software now provides companies experiencing high-volume sales order demands with more order entry options, improved visibility of orders on the shop floor, and added flexibility in product delivery.

Version 9.0 includes a new module, Sales Force Automation (SFA), a portable, Windows-version of the software's order entry system. A "Shipping Workbench" allows for improved picking capabilities so that manufacturers can easily consolidate shipments from multiple orders onto one picking document.

The MAC-PAC OPEN patented Expert Configurator module of the software now provides manufacturers with the ability to buy make-to-order items directly from their suppliers. A new Repetitive Supply module is a just-in-time supply solution designed to handle frequent deliveries from vendors in an efficient and individually tailored manner.

The software runs on UNIX platforms including HP 9000s.

Contact Marketing Operations, Andersen Consulting, 69 West Washington Street, Chicago, Illinois 60602, phone: (800) 541-7512 or (312) 507-6588.

SNMP-Manageable UPS Adapter

Tripp Lite has announced the SNMP-2 (Simple Network Management Protocol adapter), which allows users to remotely monitor AC power conditions across a network or control power to individual network devices. With the SNMP-2 adapter, the UPS now becomes a managed device sitting directly on the Ethernet.

The Tripp Lite SMART Series UPS appears as an icon on the network map on HP OpenView, SunNet Manager, Novell NMS, or other SNMP-based management stations.

Key statistics like load percentage on the UPS, battery condition, and remote temperature and humidity are available. The adapter allows control of remote devices that are not UPS-powered. The SNMP-2 adapter is manageable with the newly adopted standard UPS MIB (RFC 1628), which defines UPS attributes in an industry-standard format.

Tripp Lite's SNMP-2 adapter has a suggested retail price of $799.

Contact Tripp Lite, 500 N. Orleans, Chicago, Illinois 60610-4188, phone: (312) 329-1777, fax: (312) 644-6505.

Multiple-Systems Communications

KnowledgeNet has announced Net/WrkHP, the newest member of its Net/Wrk Product Series. Net/WrkHP provides seamless integration among multiple HP-UX systems, as well as between HP 9000s and AS/400s, IBM mainframes under MVS ESA, PCs and LANs, and other systems running KnowledgeNet's Net/Wrk products.

Like the other members of the Net/Wrk Product Series, Net/WrkHP operates across advanced Program-to-Program Communications/Advanced Peer-to-Peer networking and TCP/IP backbones using a simple command language. Without performing low-level programming, users can engage in bi-directional file transfer and remote program execution across similar and dissimilar hardware platforms. NetWrkHP also supports Dynamic SQL for accessing and updating subsets of data on remote AS/400s.

The Net/Wrk Scheduler enables programmers to schedule unattended execution of all Net/Wrk functions. The API tool Kit enables them to embed Net/WrkHP commands into existing applications. Users can send spooled files in an output queue across different platforms. The product features Lempel-Ziv 77 and 78 data compression and in-stream automatic data conversion.

Contact KnowledgeNet, 1260 W.

Northwest Highway, Paline, Illinois 60067, phone: (708) 705-0400 or (800) 292-0127.

New from Young Minds, Inc.

Premastering Software

Young Minds, Inc. has announced MakeDisc Release 1.14. The premastering software runs on 26 UNIX platforms and enables users to format datasets for ISO 9660-compliant CD-ROM production. MakeDisc provides for transparent recovery of original UNIX file names, directories, and symbolic links. The graphical user interface makes it simple to professionally produce, format, and test CD-ROM disc images before sending them to a writer or manufacturing facility.

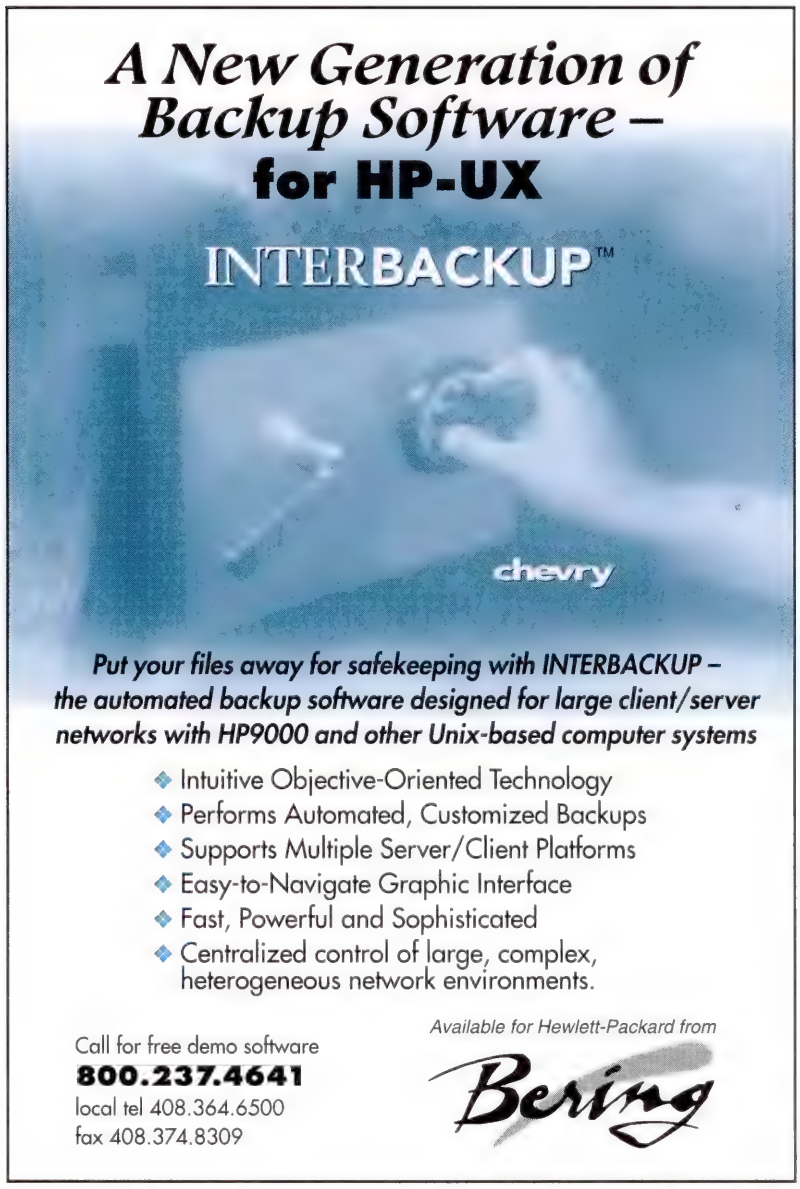
MakeDisc is at the heart of CD Studio, Young Minds' complete UNIX-based CD Recordable system.

UltraCapacity Support

Young Minds, Inc. (YMi) also announced added support for the new CD-ROM Library from Document Imaging Systems Corporation (DISC) to its family of UltraCapacity CD-ROM mass storage systems.

YMi's UltraCapacity server software resides on the file server and allows users to access data on CD-ROMs with their existing applications, file managers, and file commands. No additional client software is needed for accessing CD-ROMs on the network, nor is it necessary to modify application software. YMi's UltraCapacity is available for Windows/NT and 24 different UNIX platforms, including Hewlett-Packard.

DISC manufactures a family of automated 5.25-inch and CD optical disk libraries ranging in capacity from 150



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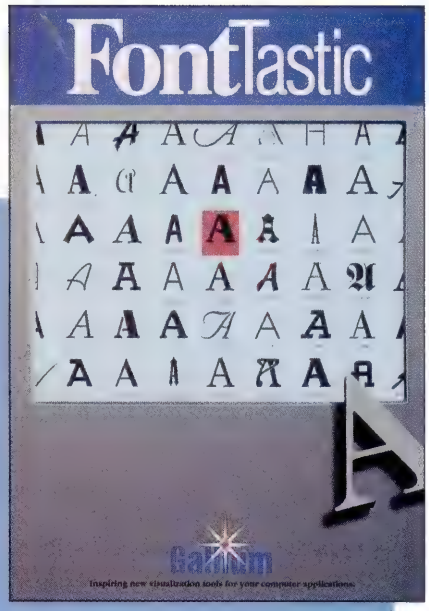

Font Management

Gallium Software Inc. has announced new Macintosh and PC font capabilities for its FontTastic font management for the UNIX desktop. FontTastic Font Manager can now install any off-the-shelf Type 1 font pack for use with FrameMaker 4.0. The FontTastic Font Server also has added the ability to display fonts in all non-Latin languages, including Kanji.

Gallium's FontTastic family includes FontTastic Font Server, FontTastic Font Application Programming Interface (API), and FontTastic Font Manager. The products enable UNIX users to buy off-the-shelf font packs and automatically install and use these fonts on any UNIX platform.

FontTastic Font Manager is a Motif utility that allows the end user to select and view fonts before it installs, groups, or deletes them from the font directory. FontTastic Font Server is 100-percent compatible with the X11R5 Font Server and can either replace the existing font server or operate in conjunction with it. It rasterizes TrueType, Type 1, and SPEEDO formatted outline fonts; applies transformations to fonts; returns outline data for a character or a set of characters; and returns raw font data.

FontTastic Font Manager is priced at $249 for a single-user copy.

Gallium Software Inc., 303 Moodie Drive, Suite 4000, Nepean, Ontario, Canada K2H 9R4, phone: (613) 721-0902, fax: (613) 721-1278.

to over 1,200 cartridges in several models, many of which are field-upgradable to higher capacities.

Contact Young Minds, Inc., P.O. Box 8130, 1910 Orange Tree Lane, Redlands, California 92375, phone: (800) YMI-4YMI (964-9464), fax: (909) 798-0488.

X Terminals

Human Designed Systems has introduced ViewStation LX Series X terminals, which reportedly are priced hundreds of dollars below competitors' X terminals and network-capable personal computers. Fully configured X terminal models, with 4 MB of RAM, Ethernet, serial and parallel port, IBM-style keyboard, and mouse range from $749 for a color model with 1,024 x 768 resolution (with no monitor) to $2,399 for a color model with a 19-inch screen and 1,280 x 1,024 resolution.

The ViewStation LX is based around a high-performance i960-based RISC architecture. Optional PCMCIA "credit card" slots or hard disk drives provide local storage. It runs the same version of HDSware, HDS' enhanced X server software, as all other HDS X terminal models.

The terminals can run local processes to offload existing host computers. Full copies of the OSF/Motif and OPEN LOOK window managers, emulation of DEC VT320 and IBM 3270 terminals, clocks, calculators, a screen saver with local lock, and a PostScript display application are included. Users also can port their own applications to the X terminal with the optional HDSware Developer's Kit.

Contact Human Designed Systems, 421 Feheley Drive, King of Prussia, Pennsylvania 19406, phone: (610) 277-8300, fax: (610) 275-5739.

Software Reuse Environment

CenterLine Software, Inc. has announced ResourceCenter, a reuse environment designed to enable users to easily catalogue, locate, and retrieve reusable software assets with minimal effort. Organizations can begin using ResourceCenter immediately with their current code, class libraries, and other reusable object-oriented software assets, the company notes. Built on a client-server architecture, ResourceCenter scales from a single workgroup to corporate-wide resource. Its open, documented interface allows users to easily add new software assets.

ResourceCenter allows users to locate and retrieve assets from within source and object code, documentation, analysis and design documents, e-mail messages, bug-tracking reports, or other online information sources. It also includes automatic, dynamic indexing.

ResourceCenter was scheduled to be available later this year for Sun SPARC workstations and HP 9000 Series 700s and 800s. Pricing is based on a client-server pricing model. A starter package, which includes the resource server and access for five clients, is $19,995. Additional clients are priced at $995 each.

Contact CenterLine Software, Inc., 10 Fawcett Street, Cambridge, Massachusetts 02138-1110, phone: (617) 498-3000, fax: (617) 868-6655.

Client-Server Integrator

Productive Software Systems, Inc. has announced that it has been selected by HP as an HP 3000 Client-Server Integrator in the new HP 3000 Client-Server Integrators Program. The company will provide client-server integration services and support to current and prospective HP 3000 customers in the upper Mid-West U.S. region. The company notes that it was chosen for its experience with HP 3000 systems, networking hardware and software, and expertise with client-server tools, languages, and applications.

The company provides consulting, planning, design, implementation, training, network support, and other client-server services.

Contact Productive Software Systems, Inc., P.O. Box 39236, Minneapolis, Minnesota 55439-0236, phone: (612) 831-8866, fax: (612) 831-3293.

Sterling and SAP Alliance

The Interchange Software Division of Sterling Software, Inc. and SAP have announced that Sterling's electronic data interchange (EDI) management software, GENTRAN, will be integrated with SAP's R/3 product family. Companies implementing SAP's R/3 applications can easily and quickly integrate Sterling's GENTRAN EDI software through an interface built specifically for SAP's applications. SAP's users can exchange business information with trading partners using standardized electronic formats.

GENTRAN is a fully integrated EDI management and translation software system that runs on mainframe, midrange, and microcomputing platforms. SAP's R/3 applications are designed for financial accounting, sales

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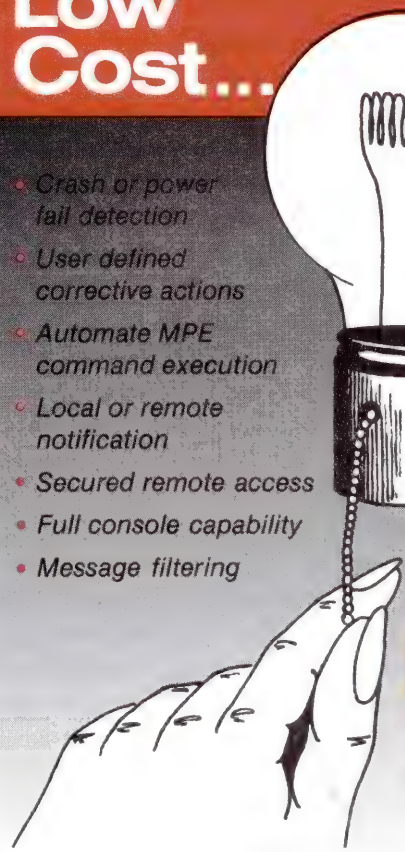

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Source Code Analysis

Advanced Software Automation (ASA), Inc., has announced ASA 20/20, an online tool for developers. Many tools are accessible through one common graphical user interface. Developers can analyze structure and logic to find potential problems quickly, customize metrics to assure code quality, and use test coverage data to guarantee thorough testing. Some features include the flow charter, which automatically generates a function's flow chart with the click of a button; the module tester, which builds function driver and stubs to facilitate independent unit/module testing; and the report generator, which allows users to customize charts and reports.

ASA 20/20 also provides the interface to the dbx debugger and other Hindsight family members such as Memlight, the memory error detection tool; the Software Quality Assurance tool; and the Test Coverage Analysis tool.

ASA 20/20 is priced at $950. Hindsight-ASA 20/20 is currently available for SunOS. Porting to the Sun Solaris, HP, and IBM platforms is planned for the fourth quarter of 1994.

Contact Advanced Software Automation, Inc., 3130A Coronado Drive, Santa Clara, California 95054, phone: (408) 492-1668, fax: (408) 492-1669.

Cross-Platform Tool

Zinc Software has announced Zinc Application Framework 4.0, designed to allow commercial and corporate software developers to develop globally enabled, object-oriented, cross-platform applications with one set of source code. Zinc 4.0 features geometry management, drag and drop, printing support, and table, notebook, and status bar controls. It supports both single-byte (ISO) and double-byte (Unicode) character sets. In addition, the library provides default string translations for more than 12 languages and support for 18 locales.

Zinc 4.0 also includes a new visual design tool featuring a software bus architecture that is fully extensible by the developer. Zinc Designer comes in both single-byte and double-byte versions to facilitate localizing applications. New platforms supported include Chicago, Power Macintosh, DESQview/X, QNX, and NEXTSTEP. Zinc already supports HP-UX and other platforms.

The Zinc Engine costs $499. DOS, Windows, OS/2, and Macintosh keys are priced at $299 each. OSF/Motif, Curses, and NEXTSTEP keys are priced at $1,499 each. The Zinc Engine and at least one key are required.

Contact Zinc Software Inc., 405 South 100 East, 2nd Floor, Pleasant Grove, Utah 84062, phone: (801) 785-8900, fax: (801) 785-8996, e-mail:info@zinc.com, CompuServe: GO ZINC; in the U.K., phone: (44-081) 855-9918; in Japan, phone: (81-052) 733-4301.

PL/I Development

Liant Software Corporation has announced significant additions to Open PL/I, designed for companies wanting to transfer mainframe-based PL/I applications to client-server platforms. It consists of the PL/I Compiler, the PL/I Macro Preprocessor and Liant's source-level debugger, CodeWatch.

Open PL/I Version 6.0 supports OLTP, VSAM, and graphical user interface GUI tools and offers additional DEC VAX VMS extensions. Open PL/I Version 6.0 is available for most open systems environments, including the HP 9000.

The new version integrates with Transarc's Encina open transaction processing environment to migrate PL/I-based OLTP applications from mainframe to UNIX environments. It also allows users to select, at compile time, one of three file management systems for VSAM support: C-ISAM, Transarc's SFS (Structured File Server), and Liant's own Open Data Access file system.

Open PL/I Version 6.0 was scheduled to be available in October. An eight-user system is priced at $20,000.

Contact Liant Software Corporation, 969 Concord Street, Framingham, Massachusetts 01701-4613, phone: (508) 872-8700, fax: (508) 626-2221.

Terminal Emulation

Software Licensing Corporation has announced IX/92 for HP 9000 Series 700 and 800 computers. IX/92 offers HP-UX users full-featured HP2392A terminal emulation for connectivity with HP 3000 host computers. This product joins the IX/92 terminal emulators for other UNIX environments, including SCO UNIX, Interactive UNIX, and Sun Solaris.

IX/92 provides full character- and block-mode support, multi-user capability,

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serial and LAN connectivity, local printer function support, and file transfer in ASCII or binary format between the HP 3000 host and local UNIX system.

The product also incorporates a script language to automate all or part of any session, including file transfer. It is compatible with X windows based environments, but will also run as a stand-alone UNIX application. It also can provide gateway capability for connecting other UNIX computers to an HP 3000 host computer.

Contact Software Licensing Corporation, Suite 280, 930 Tahoe Blvd., Unit #802, Incline Village, Nevada 89451-9436, phone: (702) 832-0881, fax: (702) 832-0883.

Backup Utility

UniSolutions Associates has announced the BART backup, archive, restore, and tape management system. BART is designed to provide easy, automated scheduling of network-wide file system backups. It keeps track of backup tapes and schedules file restores with an online tape database.

The system features an internal scheduler that performs backups automatically after scheduling parameters are set. Backup schedules can be activated or deactivated as needed. The product can provide automated access to any proprietary backup methods.

Restores can be queued for approval by an administrator, or the administrator can authorize automatic completion of restores when the media required is currently mounted or is mountable by the operating system.

The contents and status of each backup are recorded in a tape library database, as well as in a report database of scheduled backups. Tapes are labeled when first used, and the labels are enforced to prevent accidental destruction of old backups.

BART is available on all major UNIX platforms, including the HP. Licenses begin at $1,495.

Contact UniSolutions Associates, 2103 Mathews Avenue, Suite 1, Redondo Beach, California 90278, phone: (310) 542-0068, fax: (310) 370-4024.

High-Speed Backup

PDC has announced BudTurbo, which backs up and restores large servers faster and more reliably than any other utility of its type, the company notes. PDC product trials indicate BudTurbo outperforms all other backup products by up to 10 times. Typically, it moves 3.5 to 7 GB of data per hour per tape; with high-performance hardware, it moves up to 60 GB/hour. The product is said to restore data up to 50 times faster than any other backup/retrieval approach.

BudTurbo works in conjunction with another PDC software product, FreezeFrame, to ensure data security during backup without locking out users. By capturing an instantaneous view of a disk at a particular moment in time, FreezeFrame allows the original version of a file to be written to tape; writes that occur during backup are written to disk as backup occurs, eliminating the possibility of file corruption or loss.

BudTurbo also includes a utility that can perform random tape access to retrieve individual files and directories easily and conveniently.

Contact PDC, Continental Plaza, 1002 West Ninth Avenue, King of Prussia, Pennsylvania 19406, phone: (610) 265-3300, fax: (610) 265-2165.

Continued

Visual Data Analysis

Visual Numerics, Inc. has announced PV-WAVE Advantage Version 5.0, featuring a source code debugger, improved mapping funcionality, and HDF/netCDF file support.

A GUI-based source code debugger features a display of PV-WAVE source code currently being executed; the ability to edit source code from within the debugger, save it, recompile it, and continue debugging; expression-based forward and backward searching for easy navigation in source files; breakpoints to control program execution; variable monitoring; and hooks for source code editors.

The mapping functionality provide improved performance and ease of use with 16 projections, 3-D elevation plots, filled contours, a built-in world map database that can be plotted in whole or in part, and precoded routines to retrieve longitude and latitude data from the map.

A widget toolkit lets users customize their interface for faster application development. Other functionality includes advanced numerical analysis through the seamless integration of IMSL mathematics and statistics libraries, run-time licensing, and online documentation in FrameViewer.

PV-WAVE Advantage Version 5.0 costs $6,995 for a single floating license. It supports UNIX-based workstations from HP and others.

Contact Visual Numerics, Inc., 6230 Lookout Road, Boulder, Colorado 80301, phone: (303) 530-9000, fax: (303) 530-9329.

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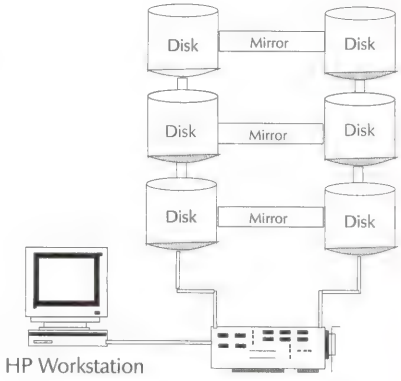

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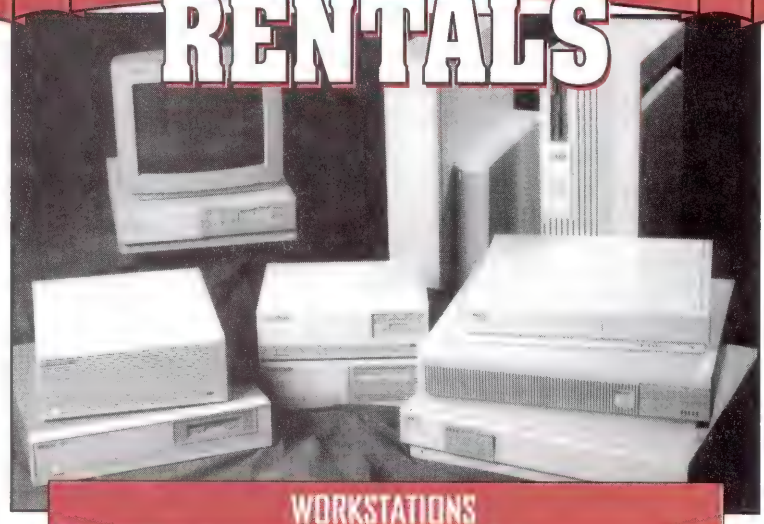

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Client-Server Electronic Document Preparation

Group 1 Software has announced DbLinks, said to be the only client-server electronic document preparation system available. DbLinks provides businesses with links between their customer and prospect databases and their printed documents.

The "What you See Is What You Get" (WYSIWYG) graphical interface is designed to enable both technical and non-technical users to produce well-designed, highly effective documents quickly and easily. Text editing and formatting capabilities include proportional and multiple fonts, logos, images, boxes, and rules.

DbLinks supports all major printing architectures and can operate in a centralized, distributed, departmental, or desktop environment under OS/2, OS/400, MVS, and UNIX. The system is printer-independent. Document and application design and testing is performed on a PC.

License fees for DbLinks range from $50,000 to over $250,000, depending on complexity of application.

Contact Group 1 Software, 4200 Parliament Place, Suite 600, Lanham, Maryland 20706-1844, phone: (800) 368-5806, fax: (301) 731-0360.

Application Management

Shany Inc. has announced AlertVIEW 2.3, which is designed to automatically detect, report, correct, and prevent application problems. Now Windows users can load AlertVIEW into protected memory and use no conventional memory. The software starts automatically with Windows, eliminating the need to install on individual systems.

End users can notify support personnel by sending a detailed message over the network. It features a new icon-based user interface for improved workstation management from the AlertVIEW Manager and new displays of running applications to simplify problem analysis. AlertVIEW 2.3 also supports Server Technology's Sentry Remote Power Manager to control PC power at remote sites.

Support personnel can be notified of critical events via third-party software to alphanumeric pagers or e-mail, as well as by SNMP alarms to standard enterprise network management consoles such as HP OpenView. AlertVIEW is 100-percent compatible with MS-DOS, Microsoft Windows, and IBM OS/2. It supports Novell NetWare 3.11 and above, Microsoft LAN Manager, IBM LAN Server, and Banyan Vines network operating systems.

Contact Shany Inc., 1101 San Antonio Road, Mountain View, California 94043, phone: (415) 694-7410, fax: (415) 694-4728.

Cross-Platform Motif

IXI Corporation, a subsidiary of The Santa Cruz Operation, Inc., has announced that IXI Premier Motif will be extended from Sun to all other major UNIX platforms. Premier Motif is IXI's package based on the OSF/Motif Graphical User Interface.

IXI Premier Motif is based on OSF/Motif 1.2.3 (as is the COSE CDE) and will be completely compatible with CDE Motif by year end. IXI's OSF/Motif 2.0 will be available later this year.

IXI Premier Motif is intended to combine robust, high-quality code with a unique developer support program. Premier customers receive updates and bug fixes on CD free of charge every quarter, together with flash updates and technical advice over the World Wide Web. IXI has taken the OSF/Motif code and added numerous bug fixes, many of them not found in any hardware vendor's Motif implementation. In an IXI survey earlier this year, customers voted overwhelmingly for the package to be extended to IBM, closely followed by HP, Digital, and SGI, the company states.

Contact IXI Corporation, 400 Encinal Street, P.O. Box 1900, Santa Cruz, California 95061-1900, phone: (408) 427-7700, fax: (408) 427-5407.

Wireless Networks

Norand Corporation has announced the Norand Wireless Protocol Stack (WPS) for UNIX and OS/2.

The WPS software allows UNIX and OS/2 applications to communicate with wireless terminals over 802.3-compatible networks. The WPS eliminates the need for a separate hardware controller or PC gateway device in systems that use Ethernet as a backbone.

The software isolates applications software from RF-specific considerations. With the WPS software executing on the host system, the wireless LAN becomes as transparent to the developer as the wired LAN, the company notes.

The WPS also supports wireless radio base stations and RS485-based backbones. Neither the design nor the implementation of the system will lock the application into a particular wireless network configuration, the company notes.

Standard VT220 terminal emulation is supported, and terminal-resident client applications are supported through a forms-based user interface or a C programming environment.

Contact Norand Corporation, 550 Second Street S.E., Cedar Rapids, Iowa

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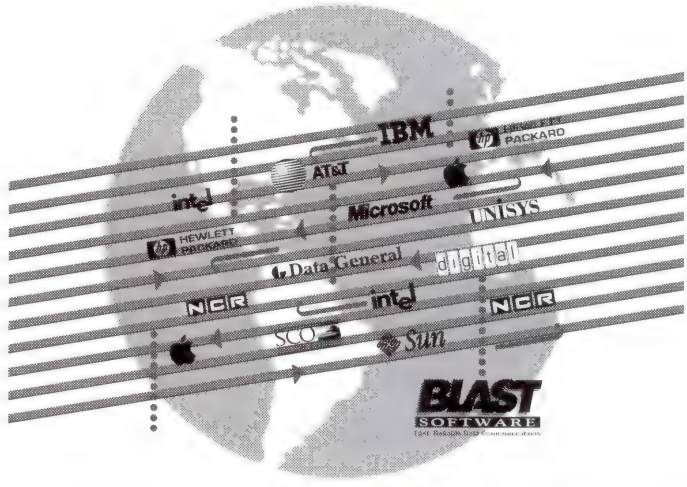

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Graphics Tablet

Hitachi Digital Graphics (USA), Inc. has announced the MultiPad 609J graphics tablet. The 6 x 9-inch MultiPad features a cordless pen, 2,540 lines-per-inch resolution, 256 levels of pressure sensitivity, 128 levels of tilt (+/- 60 degrees), and 0.007-inch accuracy. The tablet also gives up to a 205 points-per-second read rate for fast pen-to-screen drawing. It can be used in most applications supported by a mouse.

The ergonomic pen design gives the look and feel of a fine quality writing instrument, the company notes. The pen's switches can emulate all three mouse buttons to point and click in other applications.

The MultiPad will be available in five models for PC Windows and DOS; Macintosh System 7, in both ADB and serial; Silicon Graphics IRIX OX; Sun Solaris; and HP-UX.

The unit is said to have the smallest outer dimension of any current 6 x 9-inch tablet, measuring not much larger than a mouse pad and weighing just over a pound. The MultiPad suggested list will be $269 for Macintosh and $249 for PC and other models. The table and pen carry a limited lifetime warranty for parts and labor.

Contact Hitachi Digital Graphics (USA), Inc., 250 E Caribbean Drive, Sunnyvale, California 94089-1007, phone: (408) 747-0777.

52401, phone: (319) 369-3100 or (800) 553-5971, fax: (319) 369-3453.

New from HP

Cross-Platform Toolset

HP has announced Version 2.6 of its UIM/X graphical-user-interface (GUI) builder, along with the Cross Platform Toolset, a new add-on product that allows UIM/X applications to be deployed on Microsoft Windows platforms.

The UIM/X GUI builder and the Cross Platform Toolset, both developed by Visual Edge Software, Ltd., enable application developers to construct interfaces from reusable GUI object classes in a hierarchical, object-oriented manner and to use that interface code on either UNIX or Windows-based platforms.

The Cross Platform Toolset provides the objects, libraries, and documentation necessary to create production-quality applications for use on multiple platforms. Based on native toolkit controls, the toolset allows the ported application interface to look and behave like a native one. The Cross Platform Toolset also provides for the inclusion of platform-specific capabilities.

The toolset features enhanced support for methods; extended drag-and-drop capabilities for palette icons, browser nodes, and widgets; adapter widgets, which enable the integration of external C++ classes; and an enhanced "make file" template.

HP UIM/X 2.6 and the Cross Platform Toolset were expected to be available August 1. The HP UIM/X GUI builder is $4,995 per copy, and the Cross Platform Toolset is $2,495 per copy.

Distributed Smalltalk

HP has announced Version 3.0 of HP Distributed Smalltalk, which is built on and extends ParcPlace's VisualWorks Smalltalk environment to create a distributed development environments. Distributed Smalltalk Release 3.0 provides classes of objects that communicate over a network using an Object Request Broker (HP's implementation of the Object Management Group's CORBA 1.1 specification). It includes distributed programming tools such as a browser, debugger, interface repository, sample applications, and other utilities. HP's new release is available bundled with VisualWorks or stand-alone.

HP believes HP Distributed Smalltalk is the only product that provides the ability to develop distributed applications based on VisualWorks. HP plans to market, distribute, and provide technical support, training, and consulting for the bundle of VisualWorks and Release 3.0 worldwide.

New features include a shared Interface Repository, with version control and improved browsing and editing that allow users to share a common repository of Smalltalk objects on a network; increased messaging speed; a distributed debugger that allows users to debug code from a remote machine; simple access control to distributed objects; increased support for applications without user interfaces, which reduces the amount of coding required for integration; and additional sample applications.

HP Distributed Smalltalk Release 3.0 was expected to be available August 1. A single-user license of HP DST is $5,000, and the price when bundled with ParcPlace's VisualWorks Smalltalk is $10,490 (per license). DST is available on HP-UX and other UNIX platforms.

Multiprotocol Router

Rad Network Devices, Inc. (RND) has announced the RMON/ET4 module, which integrates RMON on a four-port Ethernet module for the OpenGate multiprotocol router. The product is said to be the first integrated RMON in

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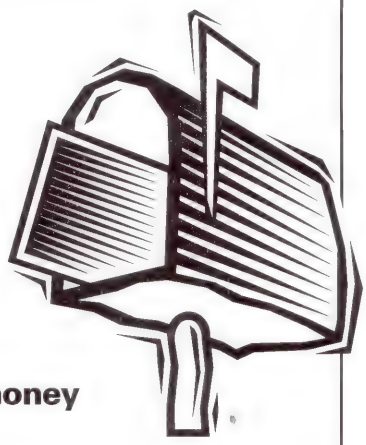

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HP OpenView Tools

Onion Peel Software (OPS) has announced the Productivity Series for HP OpenView, designed to enhance and extend the HP OpenView network and system management environment. The new HP OpenView Premier Solution Partner provides products designed explicitly for the OpenView environment.

The Productivity Series is a suite of tools that allows advanced map navigation, object management, process monitoring, reporting, and graphical Management Information Base (MIB) manipulation. It allows rapid navigation and management of the OpenView network map. Network map navigation is significantly improved, speeding the user through the topology structure.

Centralized monitoring of critical devices on a movable, resizable Object Parking Lot is provided. Network devices are added and deleted from the Object Parking Lot with a single mouse click, and status changes to the topology map are instantly visible, the company notes.

The MIBtree capability uses a graphical tree metaphor to represent the MIB structure. MIB objects and structure can be rapidly conceptualized and manipulated. Customized views into the MIB structure are built by collapsing or exploding tree branches as needed.

The Productivity Series for HP OpenView was expected to be available in September 1994. Prices were expected to start at $1,295 for the bundle.

Contact Onion Peel Software, 10829 West Bridgford Drive, Raleigh, North Carolina 27606, phone: (919) 362-7638, fax: (919) 362-8866.

a corporate backbone router.

The RMON/ET4 also can provide redundancy for an existing four-port Ethernet module on the router by hot swapping a faulty Ethernet module with the RMON/ET4 and using a simple enable function.

The RMON probe is designed to enable users to analyze multiple LAN traffic simultaneously (up to four segments) from the central site. The Intel i960 RISC processor implements all nine groups of the SNMP RMON MIB standard and provides a seven-layer protocol decoder. Performance data is collected and displayed, in both real time and trend statistics, in color graphs at the network management station.

RMON also integrates fully with OpenGate's SNMP network management systems (MultiVu/OV for HP OpenView, and MultiMan) for providing analysis of multiple LAN traffic simultaneously. Priced at $7,495, the RMON/ET4 was expected to be available in late October.

Contact RND, 3505 Cadillac Avenue, Suite G5, Costa Mesa, California 92626, phone: (714) 436-9700, fax: (714) 436-1941.

Middleware

Cornerstone has announced Piccolo, which provides a multithreaded "backbone" architecture upon which to build applications as either peer-to-peer or client-server without concern of the protocol or platform in use. Protocols supported are NETBIOS, TCP/IP, and Future Async (full duplex).

Piccolo offers a pure peer-to-peer transport subsystem for designing and building applications across multiple platforms. The delivery of messages can be totally controlled so that the same service can be provided across all platforms used for that application.

The software provides bi-directional client-server, simultaneous connections, multiple applications on various platforms, the same API for all platforms and protocols, Inter-Process Communications, no waited and non-blocking physical IOs, and unsolicited messages. It also features a layered structure, enables the use of current PC products and tools, and provides compatibility with other systems and platforms.

All physical IOs are non-waited by default, but users can designate logically waited IO by waiting for IOs to complete with an API call. Piccolo will optionally return control only when the IO is complete.

Contact Cornerstone Software, Inc., 11 Trafalgar Square, Nashua, New Hampshire 03063-1974, phone: (603) 595-7480, fax: (603) 882-7313, e-mail: piccolo@mail.corsof.com. ◧

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50,32	Bering (800) 237-4671/Fax: (408) 374-8309	31,75
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53	Concorde Technologies (800) 359-0282/Fax: (619) 458-0722	55
140	C.S.U. Industries, Inc. (516) 239-4310/Fax: (516) 239-8374	73
173	CX Soft (800) CXSOFT-1	21
169	Data Assurance (800) 654-1689	19
156	Dataram. (800) DATARAM	Inside Front Cover
164	Design 3000 Plus, Inc. (503) 585-0512/ Fax: (503) 585-1706	51
121	Diamond Optimum Systems, Inc. (818) 224-2010 or (800) 362-8271	23
155	Falcon Systems, Inc. (800) 321-5221	45
142	FutureSoft (800) 989-8908/Fax: (713) 496-1090	39
8	Herstal Automation Ltd. (813) 358-2001/Fax: (813) 358-2010	63
105	I/O Data Systems, Inc. (216) 835-2211/Fax: (216) 835-0220	33
16	IEM, Inc. (800) 321-4671/ Fax: (303) 221-1909	9
136	Innovus Inc. (905) 529-8117/Fax: (905) 572-9586	7
78	ITAC Systems, Inc. – Mouse-Trak (214) 494-3073/Fax: (214) 494-4159	5
166	KL Group (800) 663-4723	53
25	Lund Performance Solutions (503) 327-3800	61
159	Maxtech (404) 428-5000/Fax: (404) 428-5009	37
170	MDL (800) 800-3766	67
132	Monterey Bay Communications (408) 429-6144/Fax: (408) 429-1918	57
107	Newport Digital Corporation (800) 383-3642/Fax: (714) 730-3951	29
139	Operations Control Systems (415) 493-4122/Fax: (415) 493-3393	65
158	O'Pin Systems. (800) 888-1804	49
12	ORBIT Software (800) 6-Online or (510) 837-4143	27
95	Pericom, Inc. (609) 895-0404/Fax: (609) 895-0408	69
104	Proactive (415) 949-9100	Back Cover
102	Quest Software (714) 720-1434	13
152	RAC Consulting (206) 357-9572/Fax: (206) 352-8453	79
73	Robelle Consulting Ltd. (604) 582-1700/Fax: (604) 582-1799	79
138	SOLA (800) BUY SOLA	71
143	Technical & Scientific Application (800) 422-4872/Fax: (713) 935-1555	81
49	Ted Dasher & Associates (800) 638-4833/Fax: (205) 591-1108	83
135	Telamon (916) 622-0630/Fax: (916) 622-0738	77
23	Tryonics, Inc. (800) 551-6236/Fax: (603) 427-6843	Inside Back Cover
40	VESOFT, Inc. (310) 282-0420/ Fax: (310) 785-9566	53

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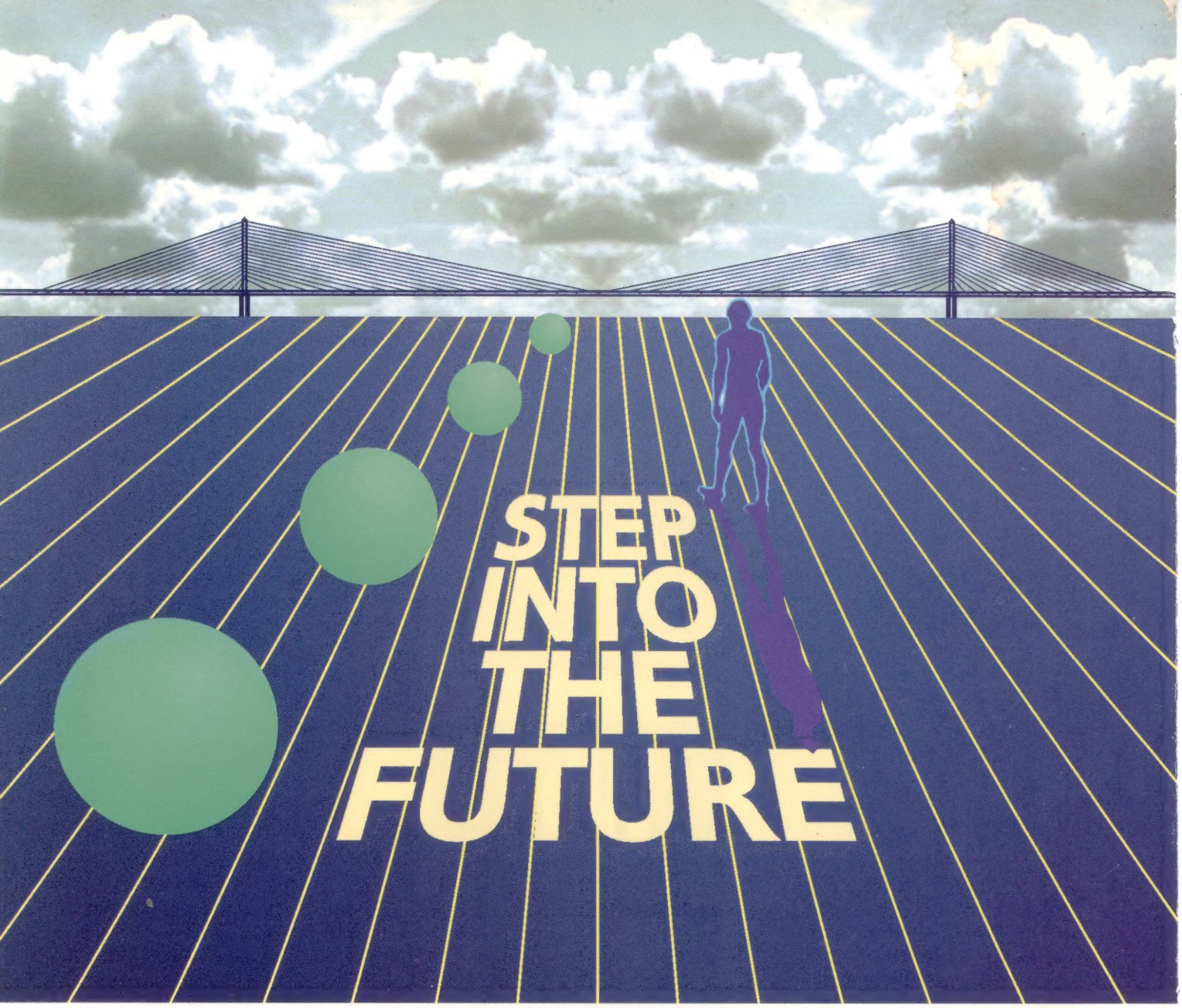

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